nu ry-February 1955

Communications—Electronics—Photography

SIGNAL

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Pilotless Bombers
Now On Duty With NATO

LARGEST PRODUCERS IN THIS FIELD FOR TWO DECADES...

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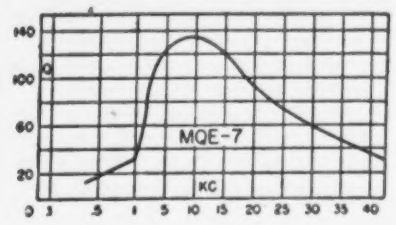
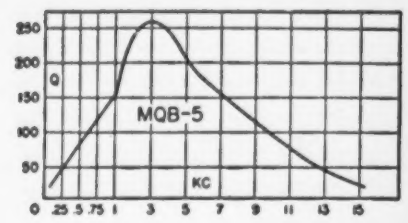
MQ Series
Compact Hermetic Toroid Inductors

The MQ permalloy dust toroids combine the highest Q in their class with minimum size. Stability is excellent under varying voltage, temperature, frequency and vibration conditions. High permeability case plus uniform winding affords shielding of approximately 80 db.

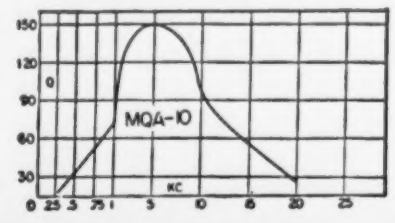


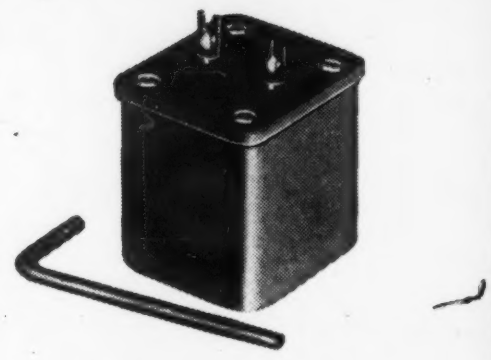
MQE
15 stock values
from 7 Mhy.
to 2.8 Hy.



MQB
12 stock values
from 10 Mhy.
to 25 Hy.

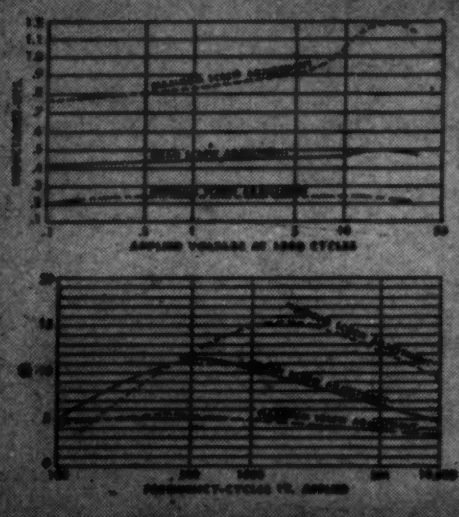
MQA
19 stock values
from 7 Mhy.
to 22 Hy.





VIC case structure

Length	Width	Height
1-1/4	1-11/32	1-7/16



Type	Mean Hys.	Type	Mean Hys.
VIC-1	.0085	VIC-12	1.3
VIC-2	.013	VIC-13	2.2
VIC-3	.021	VIC-14	3.4
VIC-4	.034	VIC-15	5.4
VIC-5	.053	VIC-16	8.5
VIC-6	.084	VIC-17	13.
VIC-7	.13	VIC-18	21.
VIC-8	.21	VIC-19	33.
VIC-9	.34	VIC-20	52.
VIC-10	.54	VIC-21	83.
VIC-11	.85	VIC-22	130.

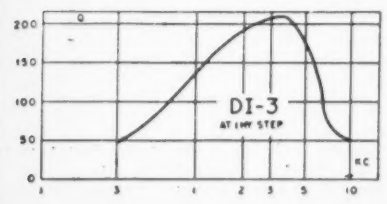
VIC Variable Inductor

The VIC Inductors have repre sented an ideal solution to th problem of tuned audio circuits A set screw in the side of th case permits adjustment of th inductance from +85% to –45% of the mean value. Setting i positive.

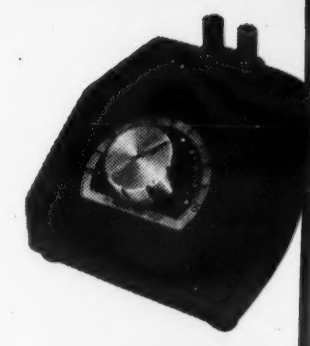
Curves shown indicate effecti Q and L with varying frequenc and applied AC voltage.

DI Inductance Decades

These decades set new standards of Q, stability, frequency range and convenience. Inductance values laboratory adjusted to better than 1%. Units housed in a compact die cast case with sloping panel ideal for laboratory use.



DI-1	Ten 10 Mhy. steps.
DI-2	Ten 100 Mhy. steps.
DI-3	Ten 1 Hy. steps.
DI-4	Ten 10 Hy. steps.

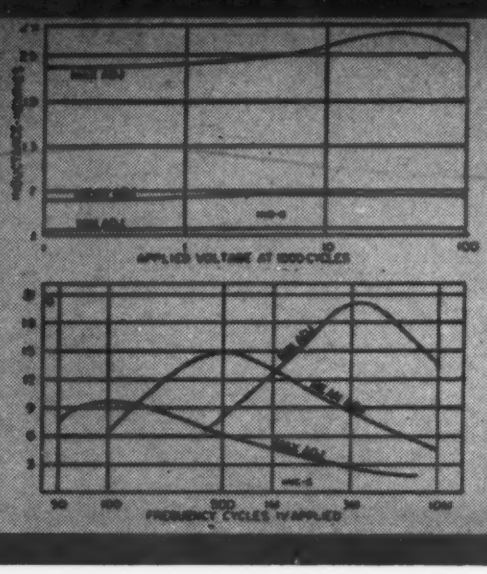


DI DECADE

Length	4½
Width	4¾
Height	2¾

HVC Hermetic Variable Inductors

A step forward from our long established VIC series. Hermetically sealed to MIL-T-27 . . . extremely compact . . . wider inductance range . . . higher Q . . . lower and higher frequencies. . . superior voltage and temperature stability.



Type No.	Min. Hys.	Mean Hys.	Max. Hys.
HVC-1	.002	.006	.02
HVC-2	.005	.015	.05
HVC-3	.011	.040	.11
HVC-4	.03	.1	.3
HVC-5	.07	.25	.7
HVC-6	.2	.8	2
HVC-7	.5	1.5	5
HVC-8	1.1	4.0	11
HVC-9	3.0	10	30
HVC-10	7.0	25	70
HVC-11	20	60	200
HVC-12	50	150	500

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Mrs. Donald Cummings, Jr., and her young son Donald

"I WASN'T ALONE ANY MORE"

Most of us know what it is like to have a telephone. But have you ever thought what it would be like if it wasn't there, even for a little while?

Here are some good words along that line from Mrs. Donald Cummings, Jr.

"When we moved into our new house," she told us a few weeks ago, "I felt a little strange—with a young baby and all—and I couldn't seem to get a feeling of being settled and at home.

"Then the telephone was put in. And suddenly everything seemed different. I could call people! I felt better about being by myself in the house with the baby. I felt better about my mother who had been ill in Boston. And about my husband in uniform far away.

"And then I realized that it wasn't just the telephone calls I could make—it was that people could call me if necessary. I wasn't alone any more."

BELL TELEPHONE SYSTEM

Reminding you that someone, somewhere, would like to hear your voice today.

SIGNAL

Communications-Electronics-Photography

Journal of the Armed Forces Communications and Electronics Association

VOLUME 9 JANUARY-FEBRUARY 1955 NUMBER 3

FEATURES

DEPARTMENTS

Authors are entirely responsible for opinions expressed in articles appearing in AFCEA publications, and these opinions are not to be construed as official or reflecting the views of the Armed Forces Communications and Electronics Association.

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Memo to SIGNAL Readers:

The Chapter News section in this SIGNAL is a particularly good one. You'll enjoy reading what AFCEA chapters throughout the world are doing at their meetings. There are enough ideas here (if you run out of them yourself) to keep a program chairman going for two or three years.

Especially interesting is an item regarding the really worthwhile project of our San Juan, Puerto Rico, Chapter. The members of this chapter have discovered a way of electronically helping out some of their less fortunate fellow-citizens.

To quote from Jose Dominguez (San Juan Chapter president), "The problem is as follows:

"1. The blind of this community are being taught to paint, to draw, to sing, and, in general are being taught not only basic knowledge, but the arts as well.

"2. Among the projects for the blind is one to teach them to present dramas and other theatrical performances. However, they naturally require a prompter or coach.

"3. It has occurred to one of the instructors of the blind that, if a low power radio transmitter could be installed on the stage and each performer equipped with a small radio receiver tuned to the frequency of the transmitter, the blind students could be taught much faster to undertake such presentations."

If any of our other chapter officials or members have any constructive ideas for aiding Mr. Dominguez in a practical, economical answer to his problem, please correspond directly with him at the following address:

Mr. Jose D. Dominguez, President
San Juan Chapter, AFCEA
Tanca y Tetuan
San Juan, Puerto Rico

And it may well be that other AFCEA chapters will want to follow San Juan's precedent in their own communities, with the same or similar projects. The field of human kindness certainly spreads into communications, electronics, and photography.

Such chapter activity and the excellent reports we have been receiving from the other AFCEA Chapters is a healthy sign and speaks well for the vitality of the Association. Good chapters make a strong association and through chapter meetings and friendships engendered, the AFCEA is able to accomplish the first step in our purpose of building national security by bringing the armed services and industry together in a spirit of good fellowship.

A good example of this is the Washington, D. C. Chapter's monthly luncheon, held at the National Press Club on the first Wednesday of each month. Here some two hundred and fifty civilians and service personnel gather for a friendly half-hour before the luncheon, then a good meal, a nationally known speaker with a short and vital message, prompt adjournment, and back at the office or job by 2:00 P.M.

I merely mention the Washington Chapter as a good example. Other chapters are reaching this goal through the type of meetings best suited to their individual locations and membership.

The friendly relations resulting from these get-togethers are of lasting value in the approach to present and future problems of our national security in AFCEA's field.

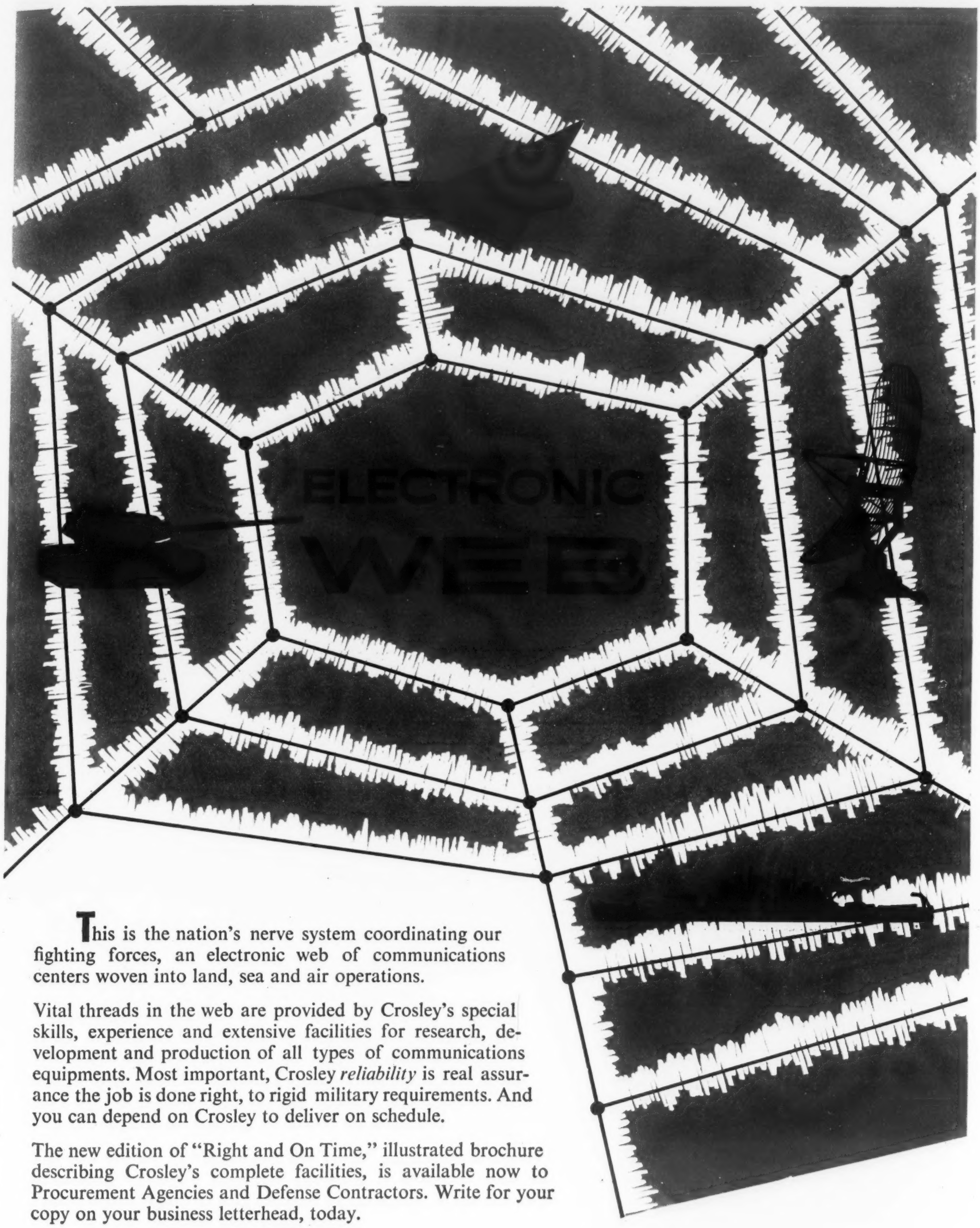
The Editor

Companies Accepted for AFCEA Group Membership Since November 1, 1954

Bruno-New York Industries Corporation, New York City, New York
Craig Machine, Inc., Danvers, Massachusetts
Dictaphone Corporation, Bridgeport, Connecticut
Polytechnic Research and Development Co., Inc., Brooklyn, New York

(Complete List of AFCEA Group Members appears on page 38.)

648 new AFCEA individual members from November 1 to January 1



This is the nation's nerve system coordinating our fighting forces, an electronic web of communications centers woven into land, sea and air operations.

Vital threads in the web are provided by Crosley's special skills, experience and extensive facilities for research, development and production of all types of communications equipments. Most important, Crosley *reliability* is real assurance the job is done right, to rigid military requirements. And you can depend on Crosley to deliver on schedule.

The new edition of "Right and On Time," illustrated brochure describing Crosley's complete facilities, is available now to Procurement Agencies and Defense Contractors. Write for your copy on your business letterhead, today.

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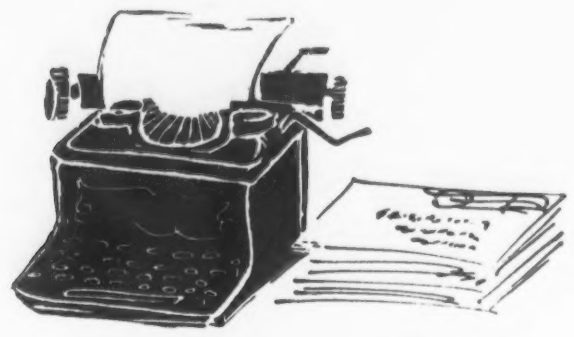

Our Readers Write

Name Change

DEAR SIR:

Congratulations on the change of the name of our Association! . . . I feel this should have been done long ago. Here's success to AFCEA.

ROBERT CARLTON
Wilkes-Barre, Penna.

Company Article

DEAR SIR:

We at Radio Condenser Company would like to express our very great appreciation for the article entitled "Tuners Are Our Business" which appeared in the November-December 1954 SIGNAL.

We have had widespread comment from various segments of the industry; in fact, you would be surprised at the attention that is given this magazine as it is circulated among the members of the AFCEA in the military branches of the electronics business.

R. E. CRAMER, JR.
Vice President
Radio Condenser Co.
Camden, New Jersey

COVER STORY - - - The "Matador"

Two squadrons of the Air Force's pilotless bomber, the Martin B-61 "Matador," are now on duty in Europe. Assigned to the Tactical Air Command's Ninth Air Force, the 1st Pilotless Bomber Squadron, stationed at Bitburg, Germany, and the 69th Pilotless Bomber Squadron in Western Germany received operational training at the Air Force Missile Test Center, Patrick AFB, Florida.

The 1st Pilotless Bomber Squadron was activated in October, 1951. Before its deployment to Europe in March of 1954, the squadron received training with the 6555th Guided Missile Wing at Patrick. The 69th squadron joined the 9th Air Force later in the year.

Designed for tactical missions, the B-61 is similar in appearance to a jet fighter. It is powered by a turbo-jet engine and is ground launched by means of a rocket-assisted takeoff. The picture on the cover shows the "Matador" prepared for launching.

The difference between the "Matador" and conventional aircraft is that the B-61 is expendable and pilotless. The size, type and configuration of the pilotless bomber resemble conventional aircraft in operational units.

Developed and produced by the Glenn L. Martin Company of Baltimore, the "Matador," as all guided missiles, contains and is controlled by the finest electronic equipment.

Hoover Commission

DEAR SIR:

I have read a great deal in the press about the study that the Hoover Commission is making in the field of government procurement.

Why not have an article in SIGNAL on this subject? As a government contract negotiator I would be very interested in the results of this Commission's study.

RUSSELL T. MILLER
Washington, D. C.

(ED. You've second-guessed us. The March-April issue of SIGNAL will carry an article on the Hoover Commission's work by Fred Lack, a member of the Advisory Committee to the Hoover Commission Task Force on Procurement.)

Ten Reasons for Becoming a Member of the AFCEA

1. **Membership in a national non-profit, non-sectarian, non-political association, whose aims are entirely patriotic and whose interests are in the communications-electronics-photography field.**
2. **An opportunity to take an active part in preparing for the defense of the United States in time of national emergency.**
3. **A chance to help stimulate and keep alive interest in a most vital phase of our national security . . . INDUSTRIAL PREPAREDNESS.**
4. **Participation in the professional, technical, and social activities of the national association and its local chapters.**
5. **As an AFCEA chapter member, to meet and know leaders—both Industrial and Armed Service—in our communications-electronics-photography field.**
6. **Being a definite part of the civilian-military team, with the opportunity of meeting with fellow teammates in good fellowship and friendship.**
7. **A subscription to SIGNAL, journal of the Association, which is the outstanding magazine in the combined field of communications, electronics and photography.**
8. **The Association monthly News Letter, published on the first day of every month, containing items of timely interest.**
9. **A Service Department which, upon order, supplies members with books, membership certificates, AFCEA insignia, etc.**
10. **A national headquarters in Washington, D. C., which may be called upon for advice and assistance, by both individual and group members.**

Why Not Consider Becoming a Life Member?

Dues were recently reduced from $100.00 to $50.00 for Life Membership. Such membership will be an advantage to you and will also help the AFCEA by furthering its security program now.

specify contact sequences to fit the job

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cams—Each revolution is divided into 36 steps—any combination of "operated" or "unoperated" intervals can be provided.

contact arrangement—Maximum of 6 contact springs for each of the 3 cams.

spring contacts—Twin contacts. Will make and break load of 150 watts (maximum 3 amps.). "Heavy-duty" single contacts can be provided for higher wattage.

speed of operation—Self-interrupted, 65 steps per second; impulse-controlled, 35 steps per second.

vibration—Withstands up to 10.5 G.

shock and acceleration—Up to 25 G.

ambient temperatures—From −55°C. to +75°C.

weight—14-20 oz.

size—3 ¼" x 2 7/16" x 1 25/32".

You plan this relay's programming . . . for cam-switching . . . for alternate on-off operations . . . or as a "stepper." Use it to cut space, weight, maintenance costs. Automatic Electric's "OCS" Relay is shock-resistant, compact, versatile, and it simplifies engineering—

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alternate on-off operations—Replace delicate latch-in type relays with dependable "OCS" units. You can expect excellent service even under extreme conditions of shock, vibration, and temperature change.

stepping operations—Stepping is high-speed, accurate and dependable. The relay can be driven self-interruptedly to produce a time cycle or for "homing." You can extend the range of your present planning with complete facts on this outstanding addition to an outstanding line of quality relays—write today to: Automatic Electric Sales Corporation, 1033 West Van Buren Street, Chicago 7, Illinois. In Canada: Automatic Electric Sales (Canada) Ltd., Toronto. Offices in principal cities.

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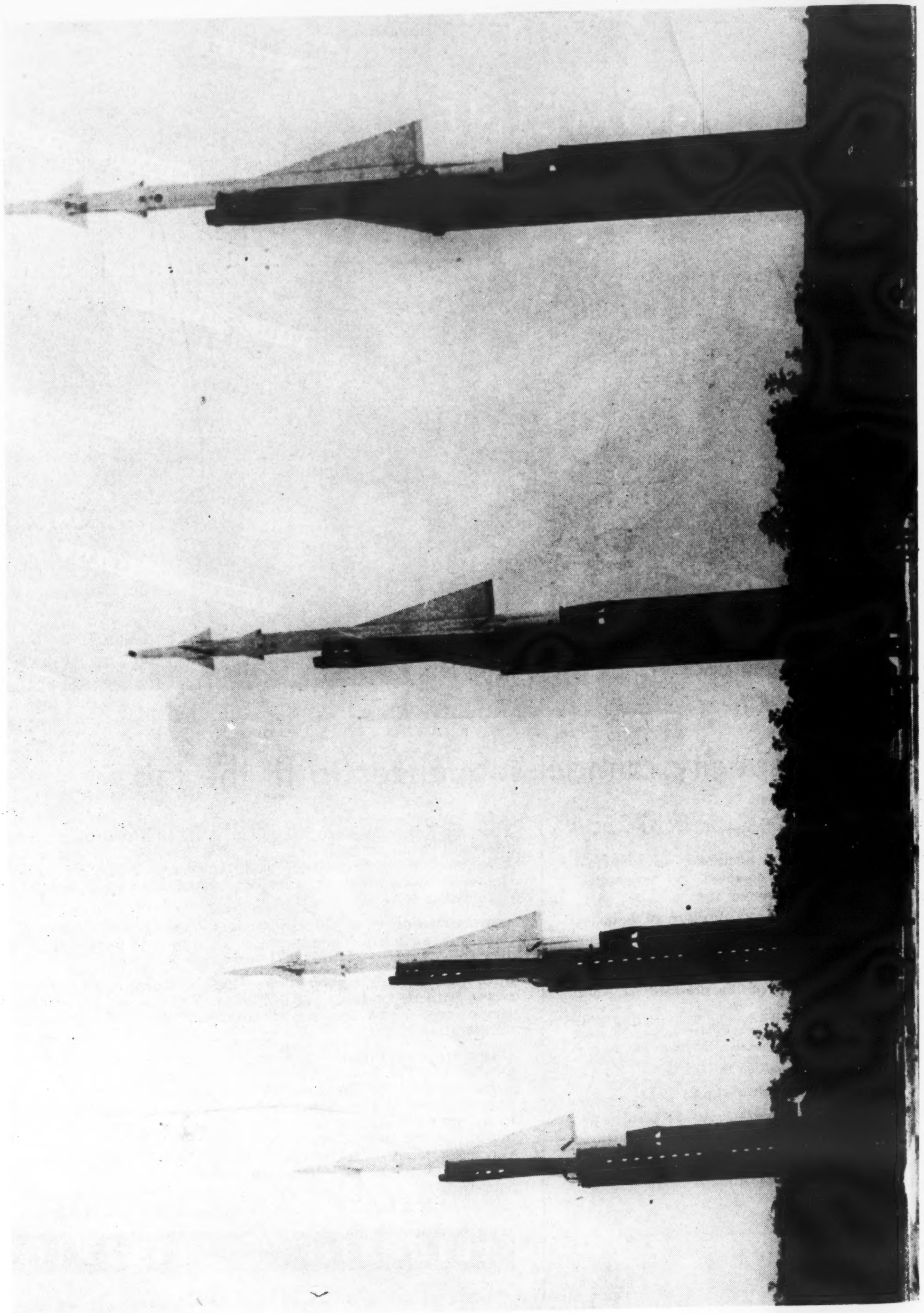


An Introduction to

Radio Telemetry

by Major Dow E. Evelyn, USAF
Hdqrs, Air Force Missile Test Center
Patrick Air Force Base, Florida

ITS NAME REVEALS ITS NATURE: telemeter—to measure at a distance. from far off. Telemetering is defined as the measurement of a quantity and the transmission of that measurement to a distant station where it may be recorded or displayed on an indicating device.

In the Air Force, flight testing programs of both piloted aircraft and guided missiles generate enormous amounts of data at such a rapid rate that it cannot be observed or recorded by an air crew—if the vehicle accommodates a crew. An airborne recorder will provide information of historical value but will not survive a ride in a one-way missile. To control an aircraft in flight, a ground observer must have, at a very minimum, the information seen on a flight instrument panel. In addition, an engineer conducting a test is interested in many phenomena of little importance to a flight crew intent only on flying.

Most gauges in common use can readily be recognized as telemetering devices. A quantity is measured, a signal proportional to the measurement is transmitted, and an indicating device is actuated. Consider the instrument panel of an automobile. Rate of travel and distance travelled are shown by means of shaft rotation. Cylinder head temperature is measured by the expansion of a gas or the change of resistance in a sense element. Fuel level information is received from a potentiometer connected to a float arm. The Bourdon tube may relay a deflection proportional to oil temperature or a pressure sensitive switch may flash a light.

Except in special instances of very short transmission paths, electrical transmission is the best method of handling data or other intelligence. Any quantity capable of being measured can be reduced to a signal for transmission from station to station by electrical means. In any uninhabitable environment, telemetering is the answer to the data collection problem.

In ground installations, a number of metallic circuits for data transmission may be installed. Radio or radar techniques must be used to relay the desired intelligence from airborne instrumentation. This discussion will be confined to telemetering systems handling such information as might ordinarily be displayed on a flight instrument panel. Rate of climb, heading, air speed, engine RPM, tail pipe temperature or any other physical state, can be measured, and that measurement translated into an angular displacement, linear displacement or a voltage magnitude. These mechanical movements are then used to vary a circuit parameter (capacitance, inductance, or resistance).

Airborne installations are always limited in size, weight and power requirements. It is necessary that the most efficient use be made of a radio transmitter. Just as carrier techniques have been used to increase the intelligence carrying capacity of wire circuits, multichannel telemetering systems have also been developed. There are two basic systems in use today. The first is known as *frequency division* telemetering and the second as *time division* telemetering.

←

Poised for peace are four NIKE Guided Missiles which have recently been installed at Lorton, Virginia, seventeen miles from Washington, D. C. The development of the NIKE, shown here in firing positions on their launching platforms, depended greatly on the use of telemetering equipment.

As more and more weapons take to the air, it has become necessary to perfect radio telemetering equipment for use in the development of piloted and pilotless aircraft designed for defense here and abroad.

Frequency division is a form of multiplexing in which individual information channels modulate sub-carrier generators. The generator outputs are subsequently combined and the resulting complex wave is used to modulate a radio frequency carrier. The sub-carrier frequencies must be separated to minimize cross modulation and permit separation by band pass filters at the receiving position.

It is common practice to use audio frequency sub-carrier generators frequency modulated by the output of sensory pickups. A mixer circuit combines the sub-carriers into a composite signal for frequency modulating an RF carrier. This is known as FM-FM telemetering, frequency modulated frequency modulation.

Up to sixteen channels have been used, but cross modulation and non-linearities severely limit the use of more than about twelve channels. A standard FM transmitter in the VHF or UHF bands will operate effectively.

At the receiver, the modulation is detected and sent through band pass filters to audio sub-carrier discriminators. The output of each discriminator is a voltage representing the quantity originally measured. The polarity, magnitude, or rate of change of an output may be significant.

Time division telemetering is a system in which the outputs of a number of information channels are successively sampled and transmitted in fixed sequence. These channels are rapidly switched on and off either electrically or mechanically by a rotating commutator with brush pick-off. Commutation is generally unsatisfactory because of brush wear, arcing, poor contact and other typical conditions aggravated by high altitudes.

Electrical time division can be accomplished by shifting the phase, or delaying the input to a pulse generator or a multivibrator. Pulses can be made to convey information by coding their width, amplitude or their position in time after a reference pulse or pulses. In all cases, synchronization between the transmitter and receiver must be effected so that the various outputs may be identified.

There are advantages and disadvantages to both systems. Frequency division telemetering provides a number of channels whose outputs must not add up to a value that would over-modulate the carrier. However, each channel can transmit a relatively high frequency governed only by its band width. There are many instances where a continuous flow of data with good frequency response must be obtained.

Time division telemetering systems have the advantage of handling a much larger number of channels with each channel fully modulating the carrier. Commutation speed and the total number of channels transmitted restrict the frequency response of each channel. Pulse transmission has the additional disadvantage of requiring a relatively wide band width in the receiving and data recording installations, but does enable a relatively low powered transmitter to emit high peak outputs.

Various combinations of the systems described above may be assembled. The resulting system becomes quite complex but readily adaptable to specific applications. A common hybrid system uses a motor driven commutator to switch the input to one or more channels of a carrier system. This technique greatly increases the number of channels available but provides discontinuous information which is difficult to record and identify.

The presentation accuracy of present telemetering systems is about two per cent. This figure can be reached only by careful adjustment and calibration. The complete system must be calibrated frequently and monitored up until the instant the flight begins. A method of calibration that works equally well on the ground or in flight is desirable. One such method is to feed standard input charges into the transmitter throughout its measurement range at periodic intervals. Unfortunately, this method bypasses the sensory pickups and gives no indication of their malfunction. Accurate calibration can be performed only on the ground and therefore, cannot be rechecked once the system starts to operate. If the pickups are activated through their entire ranges under test conditions, the telemetered output can be accurately adjusted by comparison with precision test equipment just before flight.

At the receiving station the signals must be demodulated, separated and displayed. Broad band antennas and receiver systems must be used to preserve the desired characteristics of the received signals. Circularly polarized antennas have proven useful for the reception of signals radiated from an airborne transmitter. Standard radio, radar and carrier separation circuits are employed for detection and rectification.

The detector outputs can be recorded on magnetic tape or on film exposed before an oscilloscope. Instantaneous reading is possible if the presentation is displayed on a galvanometer or a direct writing recorder. Time reference signals must be fed to any recording device simultaneously with the raw data to aid subsequent data reduction.

No attempt has been made here to draw circuit diagrams or to describe specific items of equipment. This is an introduction to telemetry, a discussion of system functions. Examination of a telemetering set will show that familiar circuits are arranged in a slightly different fashion to handle a particular form of intelligence—and that there is room for improvement in this relatively new art of radio telemetry.

Greater UNIFICATION Needed

Colonel W. Walter Watts, USAR
Executive Vice President
Radio Corporation of America

calls for the electronic partnership of Industry and the Services.

UNIFICATION, AS I DEFINE IT, IS ONE OF THE BIGGEST problems facing the entire concept of electronics in its use by the Armed Forces and its supply to you by industry.

Our need, and the need of the military and the electronics industry mutually, is for *unification of effort and unification of purpose* throughout every step from the original conception, through the development, field testing, production, delivery, installation, operation and maintenance of electronic gear. Today's electronic wonders are so complex, involve so many new design and operational concepts that normal methods of getting equipment into field use are resulting in field failure of the best conceived and manufactured devices.

The quantity of electronic equipment in use by the Armed Forces has grown to almost unbelievable proportions during the last twenty years. In 1935, the use of electronics in military devices was limited almost entirely to communications, general announcing systems and sonar. A destroyer, for example, used less than 60 tubes in all its electronic equipment, and a bomber aircraft even less. Today it is not unusual for a destroyer or a large bomber to employ several thousand tubes and for a battleship, a carrier or a large ground installation to use 10,000 tubes or more.

The use of tubes is cited by everybody, including me, as a convenient yardstick to measure the complexity of the equipment in use today. We are accustomed, when confronted by such statistics, to conclude that what we need as a solution to all of our problems is increased reliability. My main purpose here today is to broaden our thinking in that respect. *Reliability is of paramount importance, but reliability by itself will not solve the problem which faces us all.*

We in the electronics industry are well aware of the need for increased reliability of equipment. We burn the midnight oil attempting to increase trouble-free usage. We know full well that equipment failures are costly in dollars and cents; that men's lives and the life of the Nation can rest on the reliability of the equipment. A study made by a joint military-industry committee in 1950 recognized the mounting importance of this problem. The survey showed that only about 33 per cent of the Navy electronic equipment was then operating satisfactorily. The Air Force reported that for some bombing system equipments only a dozen or so trouble-free hours could be expected between breakdowns.

During the past five years, however, substantial progress has been made toward improving reliability. Experience in the field has had its effect on the thinking of

the planners, the designers, the producers and the users of the equipment. Today we can set standards for performance that will give greatly increased reliability, but we are still not out of the woods. In fact it is now plainly apparent to all of us, both military and industry, *that* 100% *reliability will not guarantee* 100% *performance.* To illustrate, let me suppose the impossible achievement of 100% reliability throughout the design and production stage and let's see what can happen. First, you can install the gear improperly and all the reliability in the world won't help in that case. Second, you can operate the equipment with improperly trained personnel—result? failure of the gear to perform its mission; 100% reliability doesn't help one iota.

Now let us proceed along more rational lines than my example. No one in this day and age expects 100% reliability out of electronics or mechanical equipment of any kind. We don't achieve it commercially. Your car isn't 100% reliable and before electronics were invented you never launched or sailed a 100% reliable ship.

I repeat, my purpose is not to detract one atom from the importance of reliability. I do want to get reliability into the proper perspective. We have seen, first, how improper installation and, second, how improper training can destroy reliability. We admit the existence of some degree of unreliability, something less than 100% reliability. We readily accept normal wear and tear, and we all understand fully that we must be prepared for battle damage. In this more realistic atmosphere, let us explore some additional areas that are equally vital to reliability.

Colonel Watts delivered this talk at the recent Navy-wide Electronic Supply System Conference at the Navy Electronic Supply Office, Great Lakes, Illinois.

The third area involves maintenance support—adequate supplies of spare parts and spare assemblies—plus adequate tools and test equipment to do the job. These things must be on hand at the proper place at the time the equipment is placed in service. Everybody knows that—or do they? We have found one instance of a regulation that specifically prohibited exactly that. Spare parts and test equipment were not to be ordered until after the equipment had arrived at the base. What good does it do to talk reliability under such a condition? And what happens when the report goes into the Pentagon? The XPG/99 Super Buck Rogers electronic death ray is reported inoperative. So conclusions are drawn—the contractor can't make his great new development work, and the electronics industry has let us down again. Gentlemen, this thing is happening every day—you have some responsibility along with us to determine its true extent—you must eliminate inadequate field support in the early stages of introduction into the field as a failure factor in the reliability of electronic gear. But even this is not the end—there are many more areas needing attention.

The fourth is personnel training—obviously this covers installation, operation and maintenance personnel—trained soon enough and on hand when the equipment is put into service. We are, jointly, too often out of phase in this area. We scurry around after the fact—we get anxious about it when it is beginning to affect the reliability of the gear. This is too late—and it casts doubt in high places on the ability of the electronic industry and on some of your research and development people. This is unfair—we all have a responsibility here that we must understand and do something about.

Educational Indoctrination

Then there is a fifth area which I shall call command indoctrination. What do I mean by that? The creation of confidence within the using command that any new piece of gear will perform as specified and improve the ability of the command to perform its mission. It is quite understandable that commanders hesitate to trade the known for the unknown. But the purpose of new gear is to overcome defects in existing gear and the pressure to improve existing gear originates with the experience of the user—that is one important way in which new military specifications are laid down. But the time lag between the writing of military specifications and the appearance of equipment in the field is long, and complete changes take place in field personnel in the interval.

A process of education and indoctrination is vital. Such a program must be based on facts developed during adequate field tests of new gear, and if confidence thus created is to be maintained, then the equipment must function properly when introduced into the field. If it fails even after this indoctrination, for any of the reasons I have previously outlined, we have a difficult acceptance problem which again reflects on the integrity of the developers—be they military or industry—and producers of the gear. You gentlemen, along with those of us from industry, have responsibility in this area if we are all to escape unfair criticism.

I said at the outset that I would talk about a new approach to "unification," but practically all I have said concerns reliability—let's see if we can connect the two. If all the factors I have outlined are understood throughout the process of improving our weapon arsenal, then we shall have achieved my kind of unification. There are some suggestions I'd like to make which I think will help.

First, when it becomes apparent that improved equipment is required, I believe we have to be more practical and less theoretical. We have to get the research and development people of the Services and the industry engineers in at the *birth* of the program.

We have to take them into the field—review requirements continuously with them. Note—I say requirements. As a contractor, our objectives are defined in specifications which are derived from the requirements or military characteristics. It is inevitable in complex problems that the needs of the ultimate user are some-

times modified or distorted before they reach us as a specification. If we can have more unity of effort in our understanding of specific requirements by bringing us into the problem earlier, we will be better off.

The second suggestion is unification in the field of specifications. We should together look at the specifications on components. Industry experience indicates there are problems when joint military service specifications are used. Sometimes JAN specifications or MIL specifications give the supplier something to hide behind rather than provide the kind of control that is necessary to achieve the quality and reliability needed by the military. We run into that frequently where we are unable to make a piece of gear do what you want it to do. We find the trouble in a component and the component manufacturer says, "Well, here's a piece of paper. It meets the specs." That isn't the answer. We should seek close and unshakeable military and industry agreement on what it takes in a component to give the kind of quality and reliability that you want in the equipment regardless what may be contained in the specification.

Practical Quality Control

The third suggestion is in the area of agreeing on tests which will establish the suitability of newly designed equipment under environmental conditions and use. The military will surely sympathize with the need for practical administration of quality control without hamstringing the contractor so his production is unnecessarily delayed. If we can achieve more clearly defined tests and procedures which will be more objective towards determining the result you want to achieve in the field and not just the meeting of some specification, we can minimize some of the difficulties we were having at vendor and prime contractor plants and the Services will be assured of a product that can be relied upon to do the job in the field.

My fourth suggestion, and perhaps one that can be considered obvious, concerns the desirability of completing engineering development before embarking on large-scale production. Often in an emergency situation, and Korea certainly was a good example of that, considered risks must be taken. Much equipment was put into production before it had been completely engineered. When the risk is unnecessary, it seems foolhardy to apply the pressure of time. Of course, our engineers and your engineers are never satisfied and always think something can be made better. This is where seasoned and mature judgment is needed, based on field knowledge and experience to decide, "This is it." We have to join together in that.

Number five in my list of suggestions for what I have defined as unification involves the ordering of quantities of equipment for service test. We believe that with the great increase in the complexity of the devices we are building today that we should be of one mind in the area of procurement of service test quantities of any new gear. Substantial benefits derive both to the military and the contractor in getting pre-production equipment into early field operations so that problems or deficiencies can be uncovered, and that is the purpose of field tests. Emergency conditions may sometimes preclude taking the additional time, but wherever possible, we should be unified and united in this type of program.

Although I have already mentioned the subject of my sixth suggestion, I would like to properly and officially add it to the list. This covers the old spare parts, test equipment and instruction book problem that I do not need to elaborate on. If we have the proper unity of approach in this area this problem needs to be neither old nor new nor blue—which it too often makes us.

The seventh suggestion I would like to list has also been touched on previously in my discussion of reliability. I refer to better user preparation for new equipment.

Allied to this suggestion is the need for a greater awareness for the necessity for planning for adequate technical representatives, either your own or industry's, to help with the introduction of new gear and the training of personnel who will have to do with it. We are very glad to note that many contracts now include provisions for technical representatives for this very purpose. However, this good planning is sometimes wasted, since requests for technical representatives are not placed soon enough by the operating commands, with the consequence that the job they were put in the contract for is not achieved and their complete value is lost.

For my last suggestion, I would like to bring in the human factor. There is no military service that does not want—in fact does not insist on—quality and reliability in its equipment at the outset. I urge that you give greater thought to creating contractor incentive to produce this kind of equipment. No contractor wants to be tagged as a high cost producer. Yet to achieve the kind of quality and reliability that a military service must have, and to consider all of the factors I have been talking about up to now, it is inevitable that initial equipment cost will be higher than you could get if all of those factors were not taken into consideration. However, I think there is an offsetting advantage in that if we do take proper factors into consideration at the time the contract is let, in the long run the out-of-pocket expense to the Services and to the contractor will be less.

The qualified supplier who recognizes and faces up to the engineering and manufacturing problems is often placed, because of a lack of understanding of what I am talking about, in a poor competitive position. Of course the military service could back off on many operational requirements so that the complexity of equipment—and its cost—could be reduced. We doubt that this is the answer. We cannot believe anything less than the most advanced technology, intelligently and effectively applied, will give us what we are striving for jointly—military supremacy through the best equipped armed forces in the world.

Motorola's

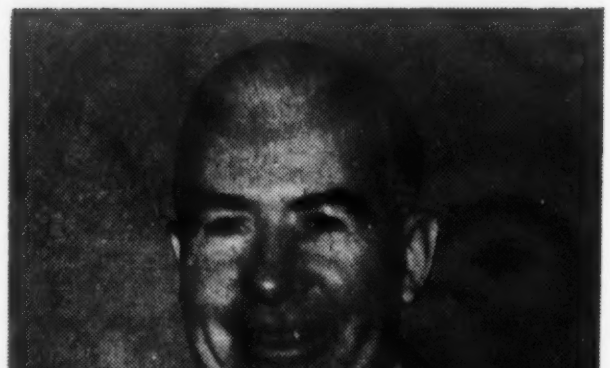
RESEARCH AT RIVERSIDE

CONTINUING ITS POLICY OF INCREASING the company's contribution to the national defense and to dispersal of strategic industry, Motorola Inc. has established a new research laboratory at Riverside, California.

The laboratory will be devoted to military research and development principally relating to guided missiles and weapons systems. The addition of the Riverside Laboratory broadens the capabilities of Motorola and makes available to industry and the Department of Defense an organization capable of conceiving, designing, testing and producing completed components and systems.

The highly competent staff which Motorola has recruited for the laboratory has distinguished itself in the past by making outstanding contributions to the design and development of air-to-air, air-to-surface and surface-to-surface guided missiles.

The nucleus of the Motorola Riverside Research Laboratory is composed of an experienced team of 40 senior scientists and engineers acquired from a former National Bureau of Standards activity which was continuously engaged in guided missile research and development since 1941. The staff will ultimately be expanded to



Paul V. Galvin, President, Motorola Inc.

200 highly trained technicians.

The staff and equipment of the new laboratory will be housed in a new, air-conditioned building containing more than 22,000 square feet of floor area. The major facilities, the electronic laboratory, the analog computer, and the machine shop, are those required for the specified research and development areas.

The electronics laboratory is being equipped with both standard and specialized modern test equipment in the fields of servo, audio, video, RF, and microwave circuitry. With this equipment, intelligence systems, electronic computers, servo-mechanisms and electromechanical ordnance devices will be designed and developed.

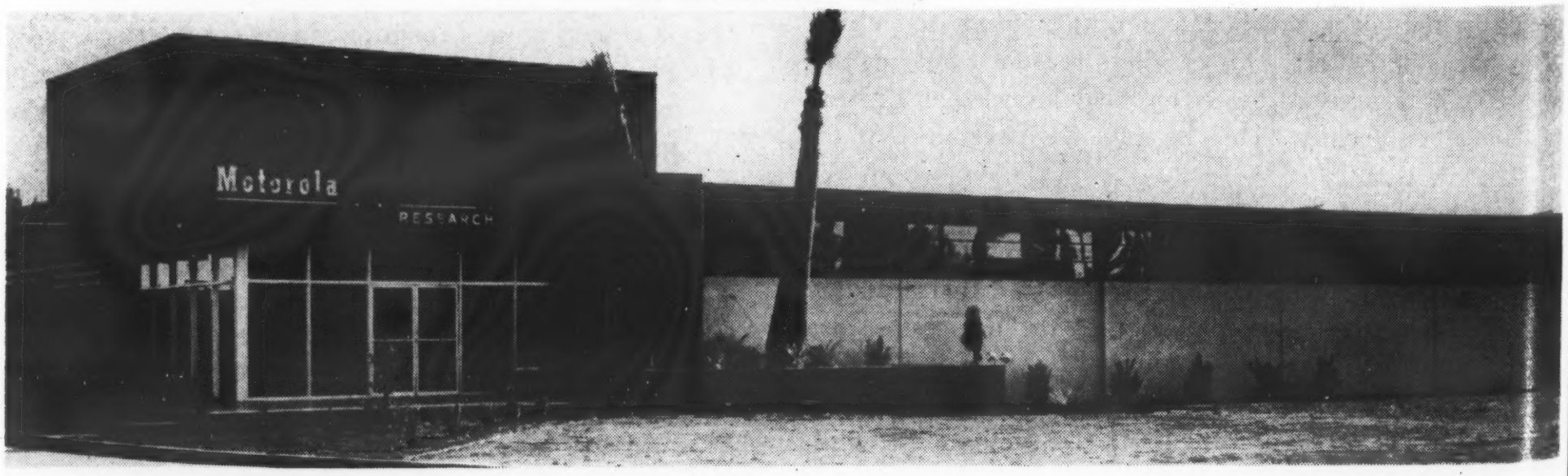
Analog computers have become essential for the design and analysis of complex weapons systems, and mathematical simulation of contemplated designs provides an effective tool for concentrating on the most promising approaches. Integration of the final equipment with the computer provides a concrete test of different designs and minimizes the required field testing of the final design.

The laboratory staff, which has pioneered in the design, operation, and use of analog computers for guided missiles, has continuously worked in the application of analog computers to weaponry during the last ten years. The Riverside computer facility will permit effective utilization and continuation of the staff's past experience.

The initial computer facility consists of 72 computing amplifiers, 16 non-linear units, two 4-channel graphic recorders, and one 2-variable plotter.

The machine shop facility is equipped to handle efficiently all mechanical construction problems which arise in the development of guided

The Riverside Research Laboratory contains 22,000 square feet of space. When fully staffed, 200 scientists and engineers will be located at the new Motorola facility.



". . . a substantial superiority of our weapons position is the only guarantee for a continued peace. Weapons superiority, in modern technical language, must be spelled in terms of electronics."

Paul V. Galvin

missiles, fuzes, and other ordnance devices. It is intended to maintain the shop at the Riverside Laboratory as a relatively small, high-precision facility, closely integrated with the needs of the research and development staff.

Of the four thousand employees in Motorola's Communications & Electronics Division as a whole, nearly fifteen hundred are assigned to eight engineering departments, with four of these departments devoted exclusively to military research and development activities. Two of the military engineering groups are in Chicago; a third is in Phoenix, Arizona, with an eight hundred-man staff; and the fourth is the recent addition, the Motorola Research Laboratory at Riverside, California.

The work in all four military laboratories is closely correlated with the manufacturing procedures used in the production plants. Equipment production prototypes developed in the laboratories can be routed into mass production in one or all of the eight Motorola plants in Chicago, in Quincy, Illinois, or in Canada without delay or lost motion.

Whenever the need arises for pilot production of an item developed at the Riverside Laboratory, such productions will be handled by the Motorola Phoenix Laboratory. Large-scale production will be allocated to the Chicago facilities.

Daniel E. Noble, Motorola vice president in charge of the Communications & Electronics Division, speaking at the dedication ceremonies on November 18th, related the new facilities to the company's overall structure for military research and development. "We are producing radar bomb sights, guided missile electronic equipment, communications equipment, and a variety of unique

Daniel E. Noble, Vice President, Motorola Inc. Communications and Electronics Division

and specialized devices in the fields of counter-measures, navigation and the radar arts." He continued, "Our research extends from solid state physics problems and the study of transistors to the dynamic systems analysis of guided missile systems and high speed navigational controls."

In the main address at the dedication ceremonies, Paul V. Galvin, Motorola Inc. president, termed the Laboratory of significance for its potential influence on the whole area of the company's work in military electronics and its effect in bettering coordination of military and industrial efforts through the procedures of operations research and dynamic systems analysis.

Manufacturers must learn, he said, how to build complex equipment which will perform within narrow tolerance limits and still be produced at reasonable cost and be maintained in the field by normally qualified technicians. Galvin stated, "Weapon superiority must be spelled in terms of electronics. Whether you refer to guided missiles, airplanes, anti-aircraft fire control, communications, or to the manufacture and the delivery of the atomic and the hydrogen bombs, the automatic control and the degree of effectiveness of the weapon is determined by electronics."

In closing he said, "I dedicate this Motorola Research Laboratory to the defense of our country, and I express the hope that it will contribute significantly to the improvement of electronic equipment reliability."

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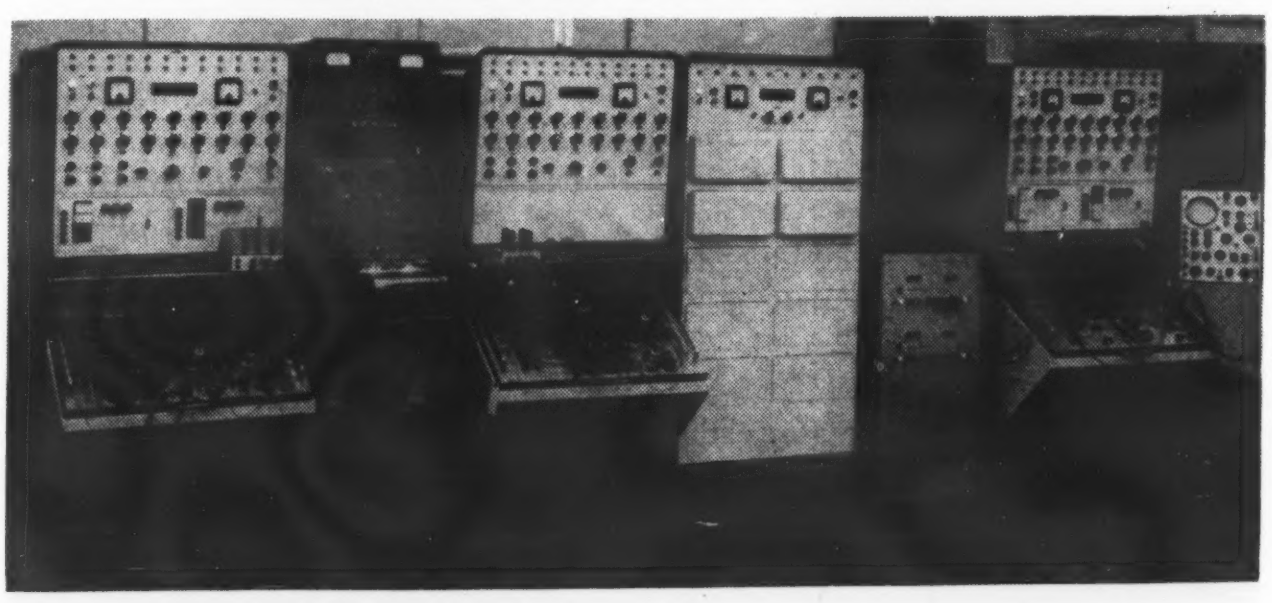
An analog computer is one of the elaborate pieces of equipment which have been installed at the Laboratory. A fully equipped electronics laboratory is also part of the special facilities to be used for research and development work.



The Hook-Up for Indus

by J. Lewis Powell

ARE YOU A MANUFACTURER, TECHnician or member of the Armed Forces? In event of war, what you do, and what you do it with depends largely on lists of items known as the Preferential Planning List or Departmental Lists. Attention was focused recently on the Preferential Planning List when an article appeared in the *New York Times* of December 10th. Business papers and trade journals have regularly talked about the List, yet few people are familiar with its use.

The formal "Preferential Planning List" of the Department of Defense and the informal departmental lists of the Army, Navy and Air Force spell out the military items on which industrial mobilization planning is being concentrated.

Collectively these lists are all working parts of the revised Production Allocation Program of the Department of Defense. (This program was drastically revised on 26 January 1954, by Department of Defense Directive 4005.6. This directive, which corrected the errors of Korean planning, is just now beginning to be felt by industry.)

The Production Allocation Program, as revised, is the principal plan by which the Army, Navy and Air Force plan our industrial backup in the event of war. The logistics of modern war demands that military might and industrial might be synchronized for defense.

For obvious security reasons the Preferential Planning List and the departmental lists are classified, and detailed information about them is not readily available. However, in broad terms every present or potential manufacturer of military items should know how the lists affect him. Similarly, commanding officers should know how the lists will affect their supply-lines in an emergency.

Just as the strongest man is not necessarily the best boxer, the nation with the greatest industrial strength is not necessarily the nation best prepared to defend itself. The boxer must have the skill and coordination to suddenly translate his strength into punches. The nation must have the mobilization plan that will quickly translate its industrial might into weapons for its armed forces.

Never again will there be time to bungle it through, to have too little, and be too late, yet win; the days, when we could mobilize, using trucks as make-believe tanks, and brooms marked rifles, have gone with the wind of the H Bomb.

Modern weapons eliminate time and space as the outer bulwarks of our defense. We may not have "time to mobilize" while the battle line is held at some distant outpost. *These same weapons which destroyed our "get ready time" have multiplied ten fold our dependence on communications and electronics.* If war comes, we must be prepared to produce an avalanche of modern equipment.

War, like fire, is a disaster. Just as we remain prepared to fight the fire which we hope will never happen, so we must be prepared to fight the war which we hope will never happen.

In case of fire your town immediately uses its domestic water supply as a weapon against fire. In the same manner an industrial nation must be able to quickly change mass production lines, into war production lines.

Just as you can't organize a volunteer fire department after the siren sounds, it is too late to organize war production after the shooting starts.

For years on shipboard in the Navy every sailor has had an assigned "Battle Station." In an emergency he knows where he is to go and what he is to do. The same kind of common sense now dictates that potential defense production plants should also have "Battle Stations." These plants should always know what they are supposed to do in event of war. They need to know what they are to make, whom they are to make it for, how much and how fast.

Combined "Know-How"

Under the Production Allocation Program, as revised, each day more of industry learns its probable production assignment in event of war. Daily, key personnel of the Army, Navy, and Air Force meet with industrial executives as team mates. Working together they combine production "know-how" and military logistics to develop tentative orders for production if war threatens. These tentative mobilization production schedules represent stockpiled "know-how," ready for defense. In an emergency these pre-planned schedules can trigger our production lines in-

...ial Logistics

A concise digest of the policy of the Department of Defense for mobilization of industry in case of emergency

to all-out production immediately.

Here is how it's done. Semi-annually the Department of Defense (Army, Navy, and Air Force) publishes for its internal use a book in three volumes known as the Alphabetical Register of Planned Wartime Materiel Suppliers. These volumes are the "Who's Who" of industrial mobilization, currently they list approximately 34,000 manufacturing plants. The Army, Navy, and Air Force select facilities with whom production schedules will be developed. This selection is based on the nature and quantity of the plant's potential output, plus the capability and know-how of its management.

Program In Action

When a firm is selected with whom planning is not already in progress, the following steps are taken. First, the military agency wishing to plan requests the Assistant Secretary of Defense (Supply & Logistics) to register the firm. This request results in the firm's being listed in the Alphabetical Register and in the assignment of an Armed Service Procurement Planning Officer. These men are commonly called ASPPOs by both military and industrial personnel. Actually, an ASPPO is the commanding officer of a military office having industrial mobilization planning responsibility. As ASPPO, however, he represents all of the Armed Forces (Army-Navy, or Air Force) regardless of the service to which he personally belongs. When acting as an ASPPO he is, in effect, a field representative of the Assistant Secretary of Defense (S&L) office.

His function is to act as liaison between industrial management of the plants assigned to him and all of the Armed Forces. In this way all of the Bureaus of the Navy, all the Technical Services of the Army and all of the offices of the Air Force have equal access to industrial management. But this access is on a coordinated basis which prevents management from being burdened by repetitious requests for similar information.

As soon as an ASPPO is appointed, he or his principal assistant for planning arrange a meeting with industrial management to initiate planning. At this meeting industrial management is asked to designate one of its members as Industrial Preparedness Representative. This member of management serves as an opposite number to the ASPPO. He represents the firm's management in the same way that the ASPPO represents all of the Armed Services. Working together the ASPPO and the Preparedness Representative assure that planning is sound and realistic both from a logistical and a production standpoint.

One of the first things they do is to prepare a survey of the plant. They list its machine tools and production equipment, describe its location and facilities, and summarize its potential capabilities as well as its present operations. The fact that this plant is now listed in the Alphabetical Register of Planned Wartime Suppliers is a signal to all military offices of the Army, Navy and Air Force that a plant survey is, or will soon be available for their use, and that this firm wishes to plan.

Usually the first military agency to respond to the plant survey is the service which originally requested registration of the plant. This service and all other interested military agencies develop and submit for plant management consideration proposed tentative mobilization production schedules for the manufacture of specific military items in event of war. These schedules are submitted through the ASPPO to plant management.

When the proposed schedule has been worked into practical form by the plant representative and the ASPPO it is returned to the military agency that originated it for final consideration. If the revised schedule is then satisfactory to both the military and plant management, it is made out formally as a "Tentative Mobilization Production Schedule."

As evidence of good faith this formal document is signed both by the representatives of management and industry. In event of a war emergency production of this item could start. *There would be no need for the manufacturer to hunt a military customer or for the military agency to search for a producer.* It is important that this production schedule has resulted from across-the-table planning between the consumer and the manufacturer. They were both talking about definite scheduled quantities of a specific military item for which plans and specifications were available.

ASPPOs are usually appointed from the military office nearest to the plant which has technical familiarity with the item being planned. Thus while a textile plant might have an ASPPO from the Quartermaster Corps of the Army, a shipyard in the same city might have an ASPPO from the Navy, and a producer of communications equipment would probably have an ASPPO from the Signal Corps. The important consideration is that the ASPPO be familiar with the industry and its nomenclature. Any firm in the program may request any branch of the Service that is planning with it to act as its ASPPO.

While a company with only one plant needs only one ASPPO, multiplant corporations sometimes need more than one ASPPO. The Department of Defense will appoint as many ASPPOs as necessary to service a corporation. It will parallel the operation pattern of the management of the company, appointing ASPPOs on the basis of individual plants, manufacturing divisions or one ASPPO for the entire corporation if that is appropriate.

Three points to remember are:

(1) ASPPOs should be appointed so as to parallel the operating management pattern of the corporate structure.

(2) The ASPPO represents all of the Armed Services and is their liaison for planning with your organization.

(3) After a company is registered, ASPPO responsibility may be transferred, at the firm's request, to any branch of the military service that is planning with the firm.

Regulating Criteria

Production Allocation Planning is primarily concerned with manufactured or assembled items which are made to the military specifications. Under revisions now going into effect, mobilization planning under the Production Allocation Program, is now being limited to carefully selected items which meet the following criteria:

(1) No Production Allocation Planning will be done for items which "are solely for the purpose of comfort, convenience or morale."

(2) Except as modified by (3) and (4) below, no Production Allocation Planning will be done for all other common shelf-type items which do not present difficult production problems or which can be procured on the open market without undue delay.

(3) Production Allocation Planning procedures will be limited to items which in war are necessary for:

a. Survival and retaliation
b. Maintenance of health
c. Combat efficiency.

(4) In addition, items must meet one or more of the following criteria.

a. Require either a long lead time or involve a long manufacturing cycle.
b. Are not currently in production or will be required in quantities far in excess of peacetime production.
c. Require the conversion of any industry or of a number of plants within an industry.
d. Involve materials or techniques essentially different from those in current use.
e. Involve items on which industry does not have production experience.

Recent Directive

Items meeting this criteria are divided into two groups. Thousands of items which are approved at the individual level of the Army, or Navy, or Air Force are placed only on the respective list of the military service which approved the item. These lists are known informally as "Departmental Lists." Planning for items on a departmental list is optional with each of the military services.

On the other hand a highly selected group of approximately 1,000 items considered particularly critical and important from a planning standpoint are placed on a formal list known as "The Preferential Planning List." Items on this list are the aristocrats of planning. They take precedence and priority over all other planning. A manufacturer scheduled to produce items on the Preferential Planning List is a member of the first team.

"Planned producers" are regularly invited to bid on peacetime procurement, and specific considerations are applicable to aligning current purchasing practice with schedule mobilization production. (See Defense Mobilization Order VII-7 as amended, and Department of Defense Directive 3005.3, dated 7 December 1954 which applies to items on the Preferential Planning List.)*

Mobilization planning eliminates unnecessary wartime competition for production capacity by the Army, Navy and Air Force. As a result of this planning, military stockpiles of munitions are backed up by alerted production lines ready for conversion to war production. In the event of war this means continuity of logistical support to the military and continuity of operation to management.

What should a manufacturer do to find out where he fits in the scheme of industrial readiness? If he is making or has the capacity to make important military items in event of war, he should follow this suggested program.

First, find out if his plant is listed in the Alphabetical Register of Planned Wartime Materiel Suppliers. He does this by going to the nearest Army, Navy, or Air Force Procurement Office. These offices are located in principal cities throughout the country. There he identifies himself and his official status with his company, after which the Industrial Mobilization Staff of that procurement office will advise him if his firm is listed in the Register. If it is listed, they will tell him who has the ASPPO responsibility for his firm. (Although the Alphabetical Register is a classified document, properly identified representatives of management may be shown the entries pertaining to their own firm).

Review Necessary

Once he knows that his firm is listed the manufacturer should contact his assigned ASPPO for further information. He should review the listing with the ASPPO in order to determine if it is accurate. He should reconcile his firm's records with those of the ASPPO to see if both their files are complete and currently accurate.

On the other hand if a firm finds that it is not listed in the Register, it should re-evaluate its war production potential to determine if it could produce military items needed by the Army, Navy, and Air Force in a war emergency.

(*Continued on page* 78)

*Editor's Note:—This important directive is reproduced in full on page 62 of this issue.

Aircraft Radio Corporation's Portable Comm

for ground-to-air communications

by Jac H. Karlan

The Portable Communicator and antenna, set up here on an airport dolly, can be installed with ease and simplicity anywhere. The antenna can be quickly attached to a tree or post.

In 1938 THE AIRCRAFT RADIO Corporation of Boonton, N. J. produced the famous ARC-5 and SCR-274, two-way voice equipments for military aircraft. These equipments were installed in large numbers of military planes during World War II for high frequency communications between plane and ground. Flexible, compact, light weight and rugged, the ARC-5/SCR-274 can now boast many millions of hours of satisfactory operation.

After World War II, Aircraft Radio Corporation manufactured thousands of these receivers and companion light-weight VHF transmitters for private aircraft users and others who required reliable radio operation from plane to ground.

During this post-war period it became obvious that a void existed in the field of *ground-to-air* communications, specifically where communication between temporary ground or ship installation and aircraft was concerned. The specific need was for an easily portable transmitter-receiver which would be stable and reliable in operation and easy to set up where normal AC power was not available.

It was not until the Korean war that such a system became a reality. It was then that the Aircraft Radio Corporation, called upon to manufacture this equipment, combined their R-19 VHF receiver with either the T-11B or T-13A transmitter into a single unit and designated it the ARC-12.

The reliability of the above equipment had been established over years of use under extremely adverse conditions, such as in advance areas in the Korean war where the Army's light weight aircraft and helicopters operated. The communicator had to maintain the same reliability in the redesigned package, and additionally had to meet the following design aims: it had to be easily carried, and simple to set up; one man should be able to operate it with a minimum of adjustment; it had to withstand even more mechanical shock and vibration than its airborne counterpart; it had to be proven satisfactory.

The Portable Communicator covers the frequency range of 118 MC to 148 MC, which range has been allo-

cated by the Federal Communications Commission for ground-to-air communications.

The transmitter operates on any of five crystal controlled frequencies in a pre-selected two megacycle band, while the receiver is continuously tuneable over the entire range.

In order to simplify the erection of the antenna and eliminate the need for further tuning, while still satisfactorily performing over the presoribed band, it became necessary to broadband it. Broadbanding is obtained by the use of a tuned circuit in the coupling box which, together with the antenna, provides a pair of overcoupled RF circuits. The result is that a VSWR (voltage standing wave ratio) of 2 to 2.4 over the band of 118 MC to 148 MC is obtained.

Stability of operation from the moment that the power switch is thrown is a critical factor in this type of equipment. Over a temperature range of —30° to +50°C the stability of the transmitter is better than 0.01%, while the receiver drift after a three minute warm up period is less than 0.04% over the same temperature range.

Transmitter In Detail

Essentially, the T-11B transmitter is a five channel, amplitude modulated transmitter, designed to broadcast voice signals in any two megacycle bands located between 116 MC and 132 MC. By simple switching, any one of five crystals can be selected. The crystal circuit is electron-coupled by means of condenser C-2303 to the plate of tube V-2301. C2302 is also used to prevent oscillation when no crystal is present in the circuit.

The tube complement consists of four type 5763 pentodes. The first stage is a Pierce oscillator; the plate is tuned to two times the fundamental crystal frequency. The second 5763 is a conventional tripler, and the third stage is a power-amplifier-doubler. Another 5763, used as a plate modulator in the final RF stage, drives the carrier to more than 90% modulation. (Since all stages use the same tube, inventory problems are reduced.) More than two watts of unmodulated RF power are available from the transmitter, offering a range up to 100 miles at 10,000 feet.

Power consumption while transmitting is 4 amperes at 24 volts. The transmitter receives high voltage from the R-19 dynamotor.

Transmitter T-13A is identical to the T-11B, except that the coverage of the former is in the range of 125 and 148 megacycles.

The receiver R-19 is a nine tube super-heterodyne receiver with a tuned input and two tuned radio frequency stages. The IF amplifier consists of 8 tuned circuits in three stages which are tuned to 15 MC. This choice of IF (15 MC) was made to provide good image rejection—90 DB below carrier level.

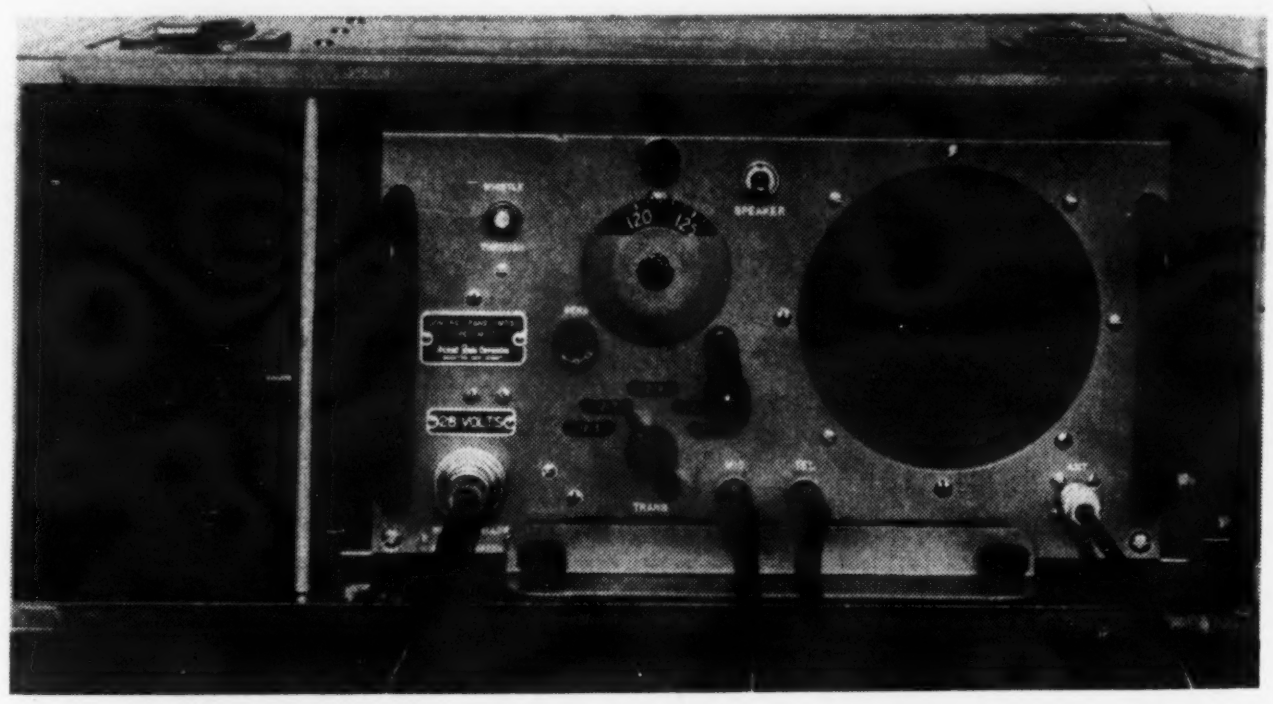
Delayed automatic volume control is provided to both the RF and IF stages. The AVC is designed to start control when the RF input to the antenna exceeds 8 microvolts and restricts the audio rise to 6 DB for a rise in input level to 100,000 microvolts. The AVC voltage is picked off at the primary of the fourth IF transformer rather than the secondary so that the output audio level is sharply tuneable, even on a signal strong enough to operate the AVC, by simply tuning for maximum audio output. If the AVC rectifier were operated from the secondary of the final IF transformer the tuning of a strong signal would be so broad that an accurate aural setting would be nearly impossible. Since another tuned circuit follows the AVC loop, the overall sharpness of tuning of receiver is essentially that of the final tuned circuit. In the absence of signal on the cathode of D_1, diode D_2 will maintain the AVC line at 3 volts. As the carrier level increases, the voltage on the plate of D_1, will become less positive until the effect of E_{k1} is overcome and D_2 opens. The AVC line is then free to go more negative with an increase in carrier level and AVC action takes place.

A means of noise suppression should be employed in a ground-to-air communicator and the ARC-12 contains an effective noise limiter combined with the detector.

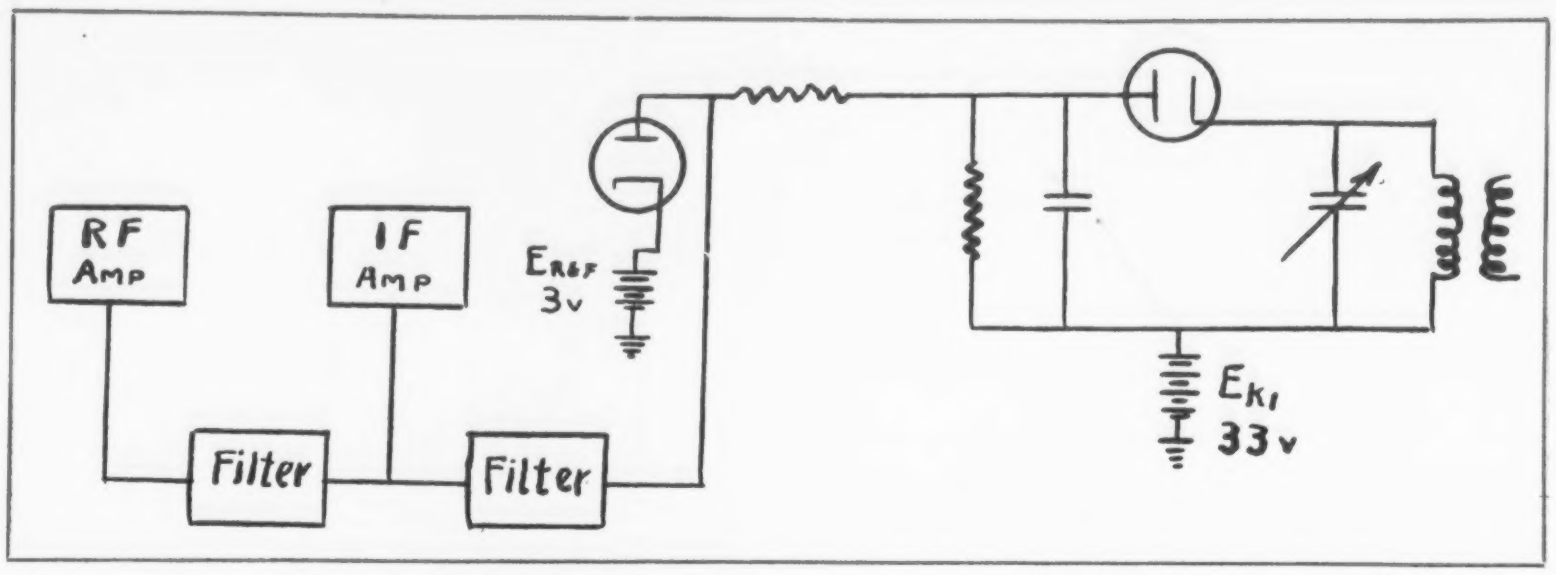
In order to obtain accurate tuning of the receiver to the frequency of the crystal used in the transmitter, a novel "Whistle-thru" circuit is incorporated in the Portable Communicator. A push-to-make release-to-break switch on the control panel actuates a neon tube oscillator circuit which modulates the transmitter carrier. Simultaneously the sensitivity of the receiver is reduced so that the carrier may be tuned in without overloading. By simply tuning for the maximum audio note, the receiver is tuned precisely to the frequency of the crystal-controlled transmitter.

The "Whistle-thru" feature may be utilized to tune the transmitter in the absence of other test equipment. The receiver is tuned for the maximum audio note and the transmitter trimmers are adjusted for maximum tone output.

Originally designed for military applications the ARC-5/SCR-274 equipments were built under stringent Air Force specifications. The specifications called for close physical and electrical tolerances under extremes of climate and mechanical conditions. These same specifications have been carried over into the design and structure of the Portable Communicator.



A close-up view of Aircraft Radio Corporation's Type 12 Portable Communicator in its carrying case. Note the "whistle-through" button on the upper left of the panel, which is used for precise tuning of the receiver to the crystal frequency of the transmitter.



In this diagram of the automatic volume control circuit, E_{K1} is the voltage developed across the cathode resistor of the third IF. Eref is the cathode voltage of the second IF.

Silicone-treated ceramics are known for their stability under climatic extremes. Silicone grease has been used effectively as a vibration absorbant when packed around the oscillator coils, yet does not affect the electrical qualities of these air core inductances. Silicone grease is also used as a lubricant in the ganged condenser section of the receiver.

The ganged condenser is operated through a worm gear and spring-loaded split-gear segments. Thus, backlash between the rotor shaft and the worm gear is reduced to an insignificant value.

Frequency variations with temperature are maintained at a minimum by matching the temperature coefficients of the condenser system (which includes the main ganged condenser, the air trimmers and the ceramic compensators) with that of the inductors in the tuned circuits. The rotors of the air trimmers and ganged condensers are of Invar and the longitudinal plates of brass; all are silver-plated.

It was decided to avoid use of all plastic and hydroscopic materials because of their mechanical limitations and electrical instability. Hence, all coil forms are made of fungus-proofed, silicone treated ceramic, and all tubes are wholly of glass, with the single exception of the audio output tube, the 12A6.

Military and Civilian Use

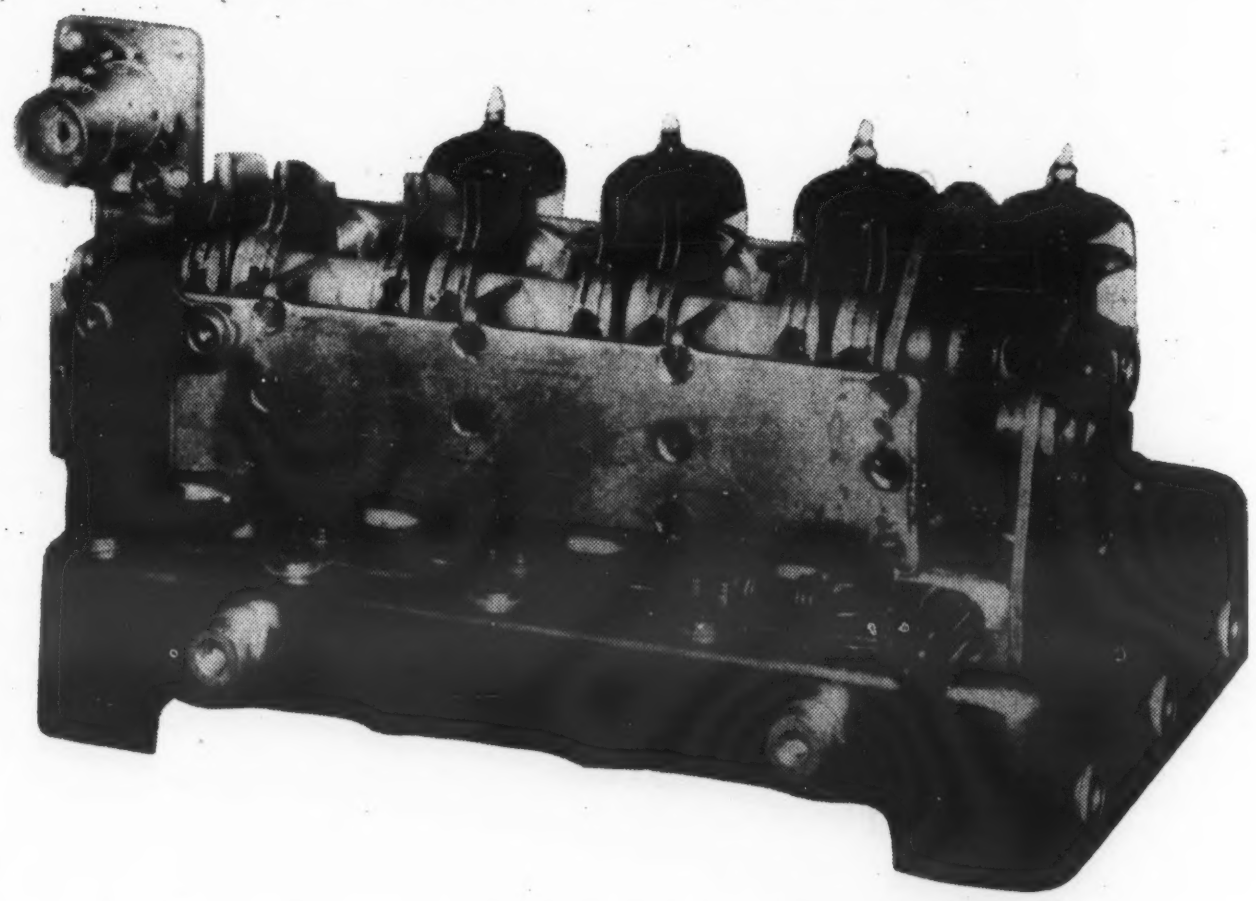
Completely self-contained, the Portable Communicator is encased in a balsa-aluminum carrying case measuring 18⅛" x 8¼" x 18$\frac{5}{16}$", and the total weight is less than 37 pounds. The equipment has a present military value and, in the future a wider value as a tactical tool for both military as well as civilian use can be foreseen.

Additional adaptability is given the Portable Communicator by extending its coverage into the Ultra High Frequency range. This is done by replacing the T-11B or T-13A with ARC's TV-10 transmitter and the VHF antenna with one cut for the UHF band.

The conclusion of World War II saw a peculiar problem on the part of the United States: the manner of disposing of tens of millions of dollars' worth of completed equipments and components which were dispersed throughout the world. Included in these remote depots were thousands of spare parts for the ARC-5 and SCR-274.

The decision to leave many of these stocks intact represents a favorable move from the standpoint of the users of the Portable Communicator. The interchangeability of the components of the transmitters and receivers which were in use during the war with those in the Portable Communicator makes replacement a simple and inexpensive operation.

Below is a close-up of the preamplifier and ganged tuning condenser which is operated through spring-loaded split gear segments and worm gear.



Increase Spare Parts

Now, with aviation expanded still further into the heavy jet operational field as well as the light propeller and helicopter craft, the various Aircraft Radio Corporation equipments are finding increased application. This in turn represents a broader need for spare parts availability. The stocks, then, are being constantly modernized and developed.

Broadened use of the Portable Communicator in its present form for ground-to-air communications, both commercial and military, has solved many of its logistics problems: mechanically and physically the Communicator has been proven; electrically it has established itself; the presence of depot stocks throughout the world simplifies replacement of components.

Quotes in Review

a survey of major statements made during the past two months

". . . Electronics are becoming, in large measure, the eyes, ears, nervous system, and, to a more limited extent, part of the brain which controls the disposition and employment of military forces and weapons.

"This in turn requires a greater investment in training to procure the skilled soldier this equipment demands. There are now more than 12,000 positions authorized in the Army for electronics maintenance specialists whose school training is in excess of 20 weeks. For example, to train a guided missile maintenance man requires up to thirty-eight weeks of schooling in addition to the eight weeks of basic training which all soldiers undergo. You can see that when you include a thirty-day leave, the soldier selected for this training is not ready to assume his duties in the Army until nearly a year after induction.

". . . a soldier, highly trained technically, is a valuable asset to our Army and one who, from the standpoint of increased effectiveness of our forces, we should like to retain on active duty."

General Charles L. Bolte, USA
Vice Chief of Staff, U. S. Army
Washington Chapter, AFCEA

"The increasing versatility of operational requirements is being manifested by growing complexity of electronic equipment. This increased complexity is recognized as a major factor of reduced reliability and increased maintenance problems. Accordingly, the situation poses a design problem in that the same technical ends must be accomplished with equipment that is less complicated and less expensive without forsaking quality and performance.

"Simplification of circuits, equipment, and systems must be carried out as a design objective from the very first stages of equipment and systems planning, up through the design, development and production phases.

"An example of simplification occurred when the requirements of some sonar equipment were reviewed. This resulted in the deletion of an oscillator and a mixer in the transmitter unit, providing greater stability and eliminating channel crosstalk problems. On this same equipment, which originally employed a three-phase synchro-system in the plan-position indicator unit and 22 adjustment controls, further development simplified the design to a two-phase deflection circuit. This change reduced mechanical adjustments from 22 to 8."

Vice Admiral R. P. Briscoe, USN
Deputy Chief of Naval Operations
(Fleet Operations and Readiness)
Washington Chapter, AFCEA

"The horizons are unlimited for the atomic power and automatic machinery industries. Certainly the problem is not over-expansion. The problem is to keep up with the needs of a new industrial revolution. We are moving into an era in which the techniques of production and many of the machines of propulsion and power will be remarkably improved. It is an exciting prospect and one promising great benefits for mankind.

"With all the technological progress, we must never forget the most important key to future success is the ability and enthusiastic effort of the men and women of American industry."

Gwilym A. Price
President
Westinghouse Electric Corporation
Year-end Statement

". . . Whether technological progress creates new weapons or better ways of living, we can no more stop that progress than we can stop the earth from rotating. We cannot explain it away nor can we ignore it away. The results of progress are here and we must live with them. If this means that nations at war would lose cities instead of soldiers in a future conflict, it is better that we recognize this reality. This would make it easier for us to put our emphasis on preventing any conflict rather than hopefully and wishfully preparing to fight any next war with weapons and tactics of the last.

* * *

"If our freedom was worth fighting for at the cost of thousands of soldiers, is it no longer worth fighting for

because the possible cost is greater? Here, I believe, is the key to the problems and tensions we face. Only by being willing to pay the higher cost of freedom can we keep our freedom. Only if the Communists are convinced that we are ready and able to pay the price of freedom, will they withhold an attack.

* * *

"Basic research, which is truly the media by which new horizons are unveiled, is characterized by success only after many failures. It does not show the immediate returns usually expected of Government agencies by Congress and the public. This is one of the reasons that military research is mostly of the applied type rather than the more abstract and probing basic types. Scientific groups and societies of industries, such as yours, can contribute immeasurably to the nation's security by sponsoring basic research."

General Nathan F. Twining, USAF

Chief of Staff, U. S. Air Force
Industrial Preparedness Dinner
American Ordnance Association

"The electron is the key to man's conquest of space. Guided missiles are equipped with electronic brains, while electronic devices on the ground guide them in flight and watch every move they make toward their target. Similarly, electronics and the modern airplane are inseparable. Electronics has led to the development of efficient aviation apparatus that is compact, light in weight and automatic. In the commercial aviation field, widespread acceptance is indicated for RCA's new weather-detection radar equipment, which will be available to airlines in commercial quantities by mid-1955."

David Sarnoff

Chairman of the Board
Radio Corporation of America
Year-end Statement

"Our technology has advanced rapidly since the turn of the century. We made amazing strides in science and in medicine. Yet there are so many things we do not know and so little time to find out about them. Our increasing technology points up a continuing need for more qualified capable scientists and engineers, more trained technicians. As long ago as 1953 it was pointed out that we are falling far behind the Soviet in the education of scientists. It was reported at that time that next year Russia will graduate 50,000 engineers as compared to 15,000 in the United States.

"We must, I feel, if we are to reap the benefits of our past gains, if we are to keep our economy strong, make the most efficient use of the brainpower of the United States, we must continue to expand our technology. We must advance more quickly. . . . And we must find the men and women capable of designing, manufacturing and operating, as well as servicing, these more complicated machines. This means simply one thing, we need a higher level of education.

* * *

"If television is the greatest communication device ever invented, if it has more impact than the printed page, more attention-getting ability than a sledge hammer, then there is no reason why it cannot be used to sell youth on the benefits of more education. I can see many other benefits of educational television. The use of television as an audio-visual aid, to speed learning, aid retention. It can push back the walls of the classroom and make learning more interesting. It offers a way of bringing the outstanding teachers of the nation into all classrooms. It could do wonders in aiding the unfortunates who are confined to their homes, and it could be of great value in adult education. But even though it can be of great help to those who are not in school, I feel that contribution will be equaled by the benefits of the use of educational television in classrooms. If through educational television, 25 percent of those who are now dropping out of school before completing high school could be convinced in continuing their education, it would give impetus to the increasing technology of the nation, to the creation of new jobs calling for greater skill and learning, to the advancement of our standard of living."

Dr. W. R. G. Baker

Vice President
General Electric Company—
Electronics Division
National Association of
Educational Broadcasters

". . . You have to start with the raw materials and follow the product all through its processing. Reliability involves in a very outstanding way the development and design engineer. It may be affected by the specification writer, by the purchasing agent, by the contractor, by the inspector, and importantly, by the quality control organization. It is affected by the responsibilities set up by the contractor. So reliability is everybody's business and everyone has to do his job right to get reliability."

William H. Martin

Deputy Assistant Secretary of Defense
(Applications Engineering)
Director of Electronics and Guided
Missiles
RETMA Radio Fall Meeting

AN/MPQ-10

A VITAL NEW USE OF RADAR IN ground combat, to detect and track down the source of enemy mortar fire, was announced in December by the Army.

The Army at the same time revealed that American ground forces in several theaters already are equipped with the electronic mortar locator systems.

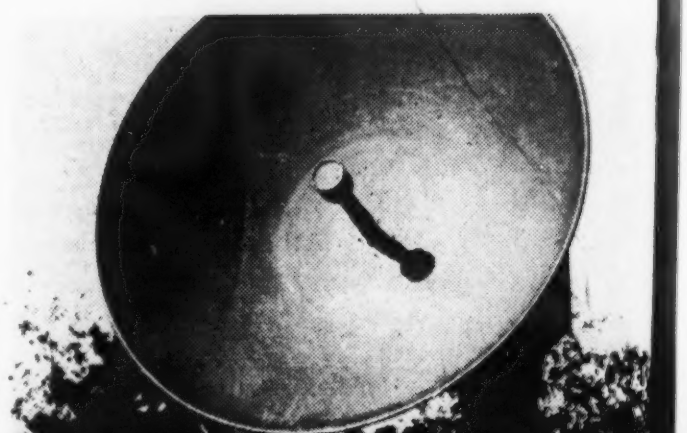
Known as counter-mortar AN/MPQ-10, the device was jointly developed and designed by the Signal Corps and Sperry Gyroscope Company. Early production systems were first flown direct from the factory to Korean battlefields in December of 1952.

The new detector is a versatile and mobile Sperry radar "eye," triple threat on defense or offense, which acts as sentry, warns of enemy movements and pinpoints enemy mortar locations for destruction.

With the aid of this new electronic locator, now far advanced from the experimental stage, front line forces can detect and "lock on" the path of enemy mortar shells, automatically track their trajectory, and obtain computer range data which reveals the enemy position.

These coordinates then are relayed to an Artillery Fire Direction Center, which responds with precisely aimed fire to eliminate enemy mortars within moments after they begin an attack. Hundreds of GI's, now returned safely from Korea, literally owe their lives to the extreme accuracy and speed of this new counter-mortar system, the Army said.

The AN/MPQ-10 equipment is compact and mobile, and can be towed by a light Army truck for quick movement in battle. The system consists of a large automatic radar tracker with dish-shaped antenna, a gasoline powered motor generator of the new Signal Corps lightweight design, a portable tracker mount resembling a 40 mm. gun carriage for rapid movement to new positions, and a separate remote control console with radarscopes and all controls used during operation of the radar set.



Above, soldiers check meters at the back of AN/MPQ-10. The accuracy and speed of this recently announced weapon saved many lives in Korea.

The remote control console of the Army's AN/MPQ-10 mortar detector can be operated from concealed positions, in protected dugouts, trenches or foxholes.

The modified gun carriage mounts six major assemblies of the radar system, including elevation and range computers. Extension cables permit the operators to work the set from remote positions more than 100 feet away from the large automatic tracker, which tilts up or down and rotates in any direction for continuous search.

One radar officer commands the

Accurate . . . . Portable . . . . Alert

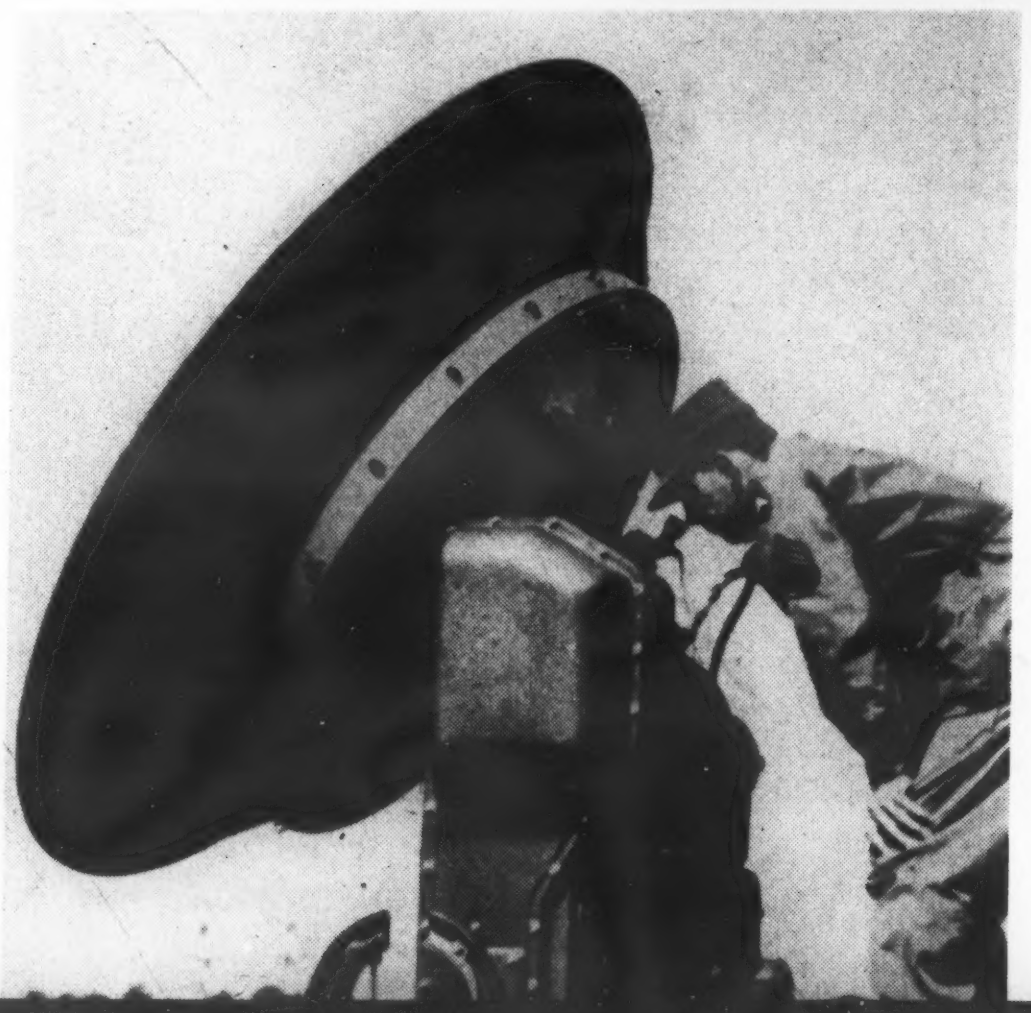
The Army's mortar detector system is added to the constantly growing list of combat weapons built around a radar "eye"

skilled operations team who translate radar plot to precise coordinates for artillery counterfire. Their portable control unit is about the size of a large-screen home television set, and can be readily concealed in protected buried dugouts, trenches or foxholes.

Present operational status of this equipment is the result of many years of intensive development by radar engineers of the Signal Corps and the Sperry company, where experimental production gained added urgency from the deadly mortar barrages encountered near the Sniper Ridge and Punch-bowl areas in Korea.

In later stages of Korean action, battleground tests proved the life-saving capability of the AN/MPQ-10 system. Early models helped spike at least one major enemy offensive, by pinpointing the location of enemy batteries in any operating barrage.

Rapid portability of the new mortar detection system is one of its outstanding features. Shown above hooked to an Army truck, it is ready to move to a new field position where it can be quickly installed, ready for operation.



The new weapon includes elevation and range computers from which coordinates are figured and relayed to an Artillery Fire Direction Center where retaliatory mortar fire can begin immediately.

THE VERY SAFETY OF THE UNITED STATES CAN DEPEND on the degree to which we progress in our ability to wage undersea warfare.

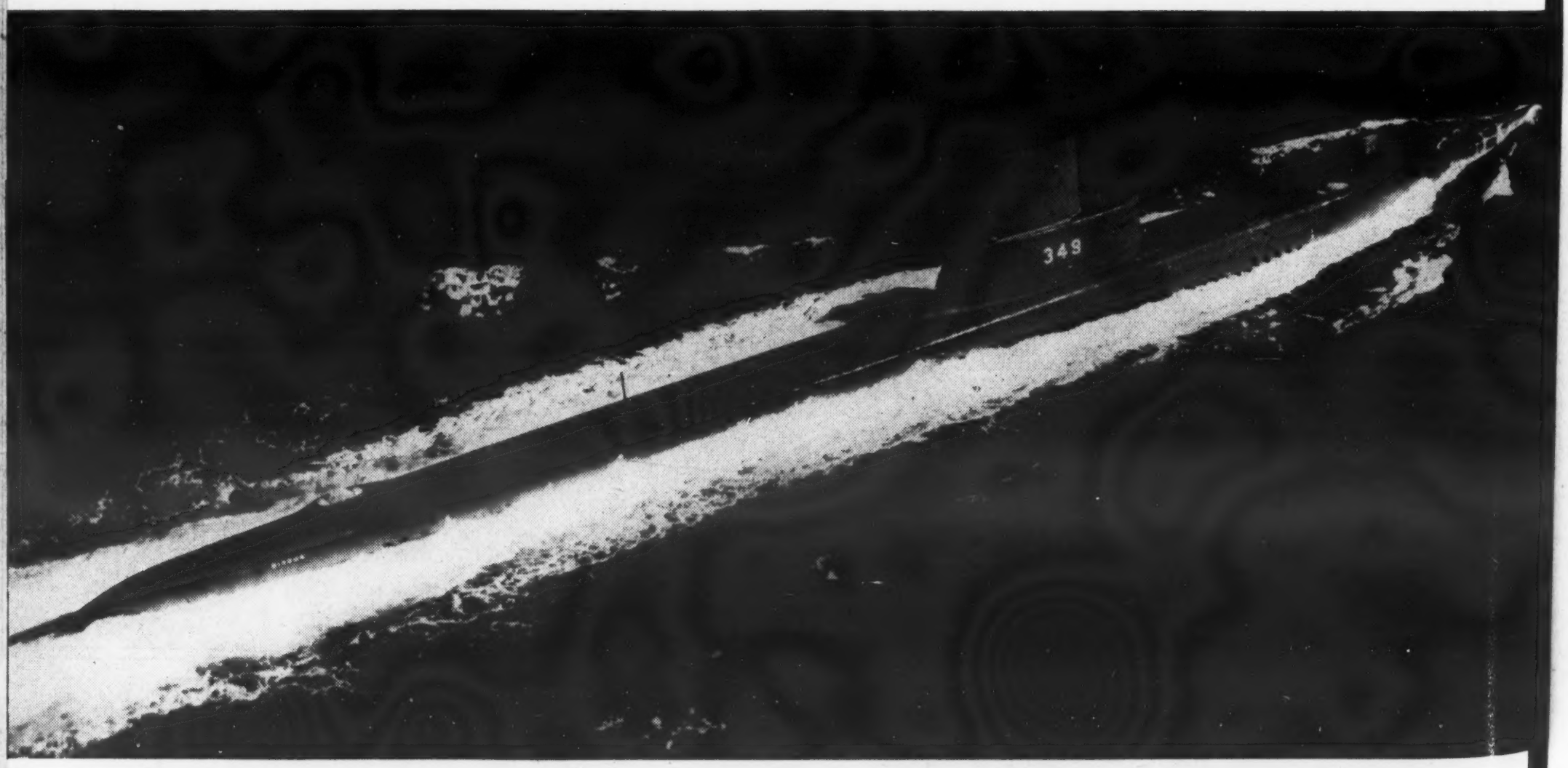
Invisibility, the special characteristic of the undersea craft, provides an enormous military advantage. Submarines have been deadly weapons of prey in two world wars. The German submarine fleet came perilously close to decisive victories over Allied shipping early in World War I and again during the first years of World War II. When the Japanese attacked Pearl Harbor, the American submarines based there were able to go on the offensive immediately. Even while the rest of the base was extinguishing fires and tending to the wounded, American submarines were slipping out to sea in search of the retiring Japanese. Before the war in the Pacific was over, our submarines had destroyed over five million tons of enemy shipping. This was 63 per cent of the total Japanese tonnage sunk during the war.

Since 1945, technology has permitted great strides forward in undersea warfare. More efficient hulls, new kinds of propulsion machinery, a greater knowledge of undersea conditions and the sharp improvements in underwater communications have permitted broadening the scope of our undersea arm, in addition to increasing its striking power. Undersea warfare as a naval science has come of age.

The Navy's new submarine *Albacore* is a fine example of post-war submarine progress and a good illustration of a Navy approach to submarine development. *Albacore* can travel faster under water than any other United States submarine now operating. Her high speed is due mostly to her shape, which is hydrodynamically superior to any of our other submarine designs. She can make the same speed as a streamlined Fleet-type submarine on about half the horsepower.

Albacore is an experimental submarine. She is a test

The Navy's Stake in Underwater Acoustics



Standing almost alone in the use of underwater acoustic devices, the Navy carries the prime responsibility for research designed to meet its needs.

by Rear Admiral Frederick R. Furth, USN
Chief of Naval Research

vehicle to help us exploit every possibility opened up by the prospect of completely submerged operations. Until now, submarines have had to be designed to operate on the surface, and have had surface-piercing hulls similar to those of cruisers. With nuclear power, we have the prospect of totally submerged operations and can design our boats to take advantage of this fact. So we need to find out all we can about streamlined bodies of revolution—in this case a submarine hull completely surrounded by water.

In designing *Albacore*, the Navy made a thorough study of airship research. The National Advisory Committee for Aeronautics tested models in a wind tunnel at Langley Field. The hull form which evolved is shaped much like an airship. It appears to be highly successful. *Albacore* is the first submarine ever constructed which can make high speeds under water with less horsepower than she would need for the same speed on the surface. The investigations which the Navy can make aboard her should provide basic information for submarines that can outperform or outfight any sub in the water today.

The heart of our underwater fleet is the *attack submarine:* the fleet type, designed to carry out the traditional submarine mission—destruction of enemy warships and cargo carriers. A major characteristic of post-war submarine progress, however, has been the development of a different type of submarine, specialized for different tasks.

The submarine has enormous potential as a *guided-missile carrier*. Two of our fleet-type submarines have already been converted to guided-missile carriers and can launch the Regulus missiles. An undersea guided-missile launcher could travel thousands of miles beneath the sea to the approaches of an enemy shore, then surface briefly under cover of darkness to launch missiles against industrial or military targets far inland. It could also provide support for amphibious operations.

The *killer submarine* is a completely new type. The Navy has built three of these small boats which were developed especially to detect and destroy enemy submarines. They are only 196 feet long, as compared with 269 feet for the new fleet types.

The killer submarine carries only one-third the crew of the large attack submarine. It is cheaper to build and requires less strategic material. Working alone, or with its team of destroyers and aircraft, one killer submarine could destroy enemy submarines as they leave their home port, or as they pass through our anti-submarine warfare barriers, or in transit. Barriers of these submarines in certain locations could do much to reduce the enemy submarine threat.

Picket submarines are another postwar development, characterized by extensive radar gear. Their mission is to cruise far out in front of the fast carrier task forces, watching for enemy guided missiles or aircraft. Several World War II submarines have been converted to radar pickets. They will serve as prototypes for future construction.

High-speed picket submarines could also act as sonar pickets, leap-frogging ahead of the task force to sweep a submarine-free passage. In the approaches to the enemy shore line these submarines could relieve the radar-picket destroyer in areas where the enemy might have air superiority.

Special *minelaying submarines* are under development. They will be equipped to plant minefields as well as attack. As minelayers, their mission will be to enter enemy harbors, lay their mines and slip away unnoticed.

Submarines can help solve the problem of supplying a fleet thousands of miles from its home base. Surface auxiliaries—cargo ships, transports and oilers—are constantly exposed to enemy attack. As one approach to this problem, the Navy has developed special auxiliary types of submarines. Their job is to carry supplies, ammunition, troops, and fuel to our far-flung bases in combat areas without the enemy's knowledge or interference. The advantages of surprise and deception afforded by *logistic submarines* could also be an important factor in an amphibious operation.

The newest, most formidable weapons in our under-

water arsenal will be the nuclear-powered submarines. *Nautilus, Sea Wolf* and their successors will be true submarines, able to cruise under water indefinitely at high speed. They will not have to surface to charge batteries. They will be the first of man's creations to have the depths of the sea as a natural habitat.

A nuclear-powered submarine could be used in nearly every kind of fleet operation. *Nautilus* and *Sea Wolf* will be attack submarines, but their special advantages will have value in virtually all of the missions of the undersea fleet. When hunting enemy ships or submarines on a war patrol, the nuclear-powered submarine would never lack the speed or endurance to engage a target. It would not have to cut off an engagement because storage batteries are running down, or lie quietly on the bottom awaiting the coming of darkness in order to surface in safety for a fresh supply of air.

Potential of the Submarine

The development of nuclear power and our growing knowledge of undersea conditions open the door to important developments in the future of undersea warfare. The submarine is part of a flexible weapons system. It has enormous potential for carrying out a variety of missions in support of the Navy's historic role—maintaining control of the seas. Allow me to try to summarize the potential military future of the submarine by listing some of the tasks for which the submarine is suited:

1. The task of denying the use of the seas to the enemy by eliminating his surface navy and his merchant marine. This is the traditional role of the submarine.
2. To sink enemy submarines and destroy their bases as part of the anti-submarine warfare forces.
3. To act as part of the fast carrier task forces and support and protect these forces by serving as sonar-radar pickets.
4. To guide and deliver guided missiles for the destruction of land targets.
5. Acting as part of the amphibious forces, to land saboteurs and to effect reconnaissance, to land and support troops, and to provide logistic support on our beachheads under enemy air control.
6. To provide lifeguard services and air-sea rescue for our air forces, particularly in waters over which the enemy has control of the air.
7. To contribute to the continental air defense, as early warning radar pickets, far offshore.

This outline of possible future missions for the submarine emphasizes the growing importance of underwater acoustics research to naval operations. No other technique for the solution of many undersea warfare problems appears to offer the versatility and the over-all effectiveness of acoustics. We have already made much progress through the application of this tool to the problems of detection, tracking, fire-control, quieting, homing, navigation and communications.

The basic means of underwater communication today is sonar. Sonar devices are the eyes and ears of the submarine. In the past, sound gear has been secondary to the periscope as a means of communication for the submarine commander. In the future *it will be the primary means of prosecuting an undersea attack.* The success of our future submarine operations will rest to a large extent on new and more exact knowledge of the behavior of sound in sea water and the use of this knowledge in development of underwater listening equipment.

With the development of nuclear-powered submarines that can traverse the ocean without surfacing, long-range subsurface navigation is a growing problem. These submarines must have the means for navigating over long distances without ever being able to take a bearing on any celestial body or radio beam . . .

The submariner of the future may turn to undersea phenomena or physical features for his bearings. He may find the submerged mountain peak or the underwater canyon as comforting and reassuring as the familiar headland or lighthouse of today. There are a number of possible means for underwater navigation of submarines, and our research in underwater acoustics is playing an important role in their development. Navigation by echo sounder using the topography of the ocean floor is one promising possibility. Even today a sonarman in a submarine can pick up a reef or some other obstacle in unfamiliar or poorly charted waters.

Another set of acoustic problems extremely important to the submariner are those involved in quieting. When our submarines are on patrol, we know that the enemy will be looking for them with his own sonar, so it is extremely important to keep down their noise level, in order that they will not be betrayed by the sound of their own machinery.

* * *

These problems connected with submarine operations comprise the largest group of undersea warfare problems. We must also be concerned, however, with others not so directly associated with submarines, but which also form an important part of undersea warfare.

Mines and torpedoes are our primary undersea weapons, and modern torpedoes use acoustic methods for homing on their targets. Acoustically activated mines are another part of the picture. Countermeasures against enemy mines and torpedoes also involve underwater sound. Sonar is very versatile as a means of underwater detection, as in clearing minefields. It can be of great assistance to underwater demolition teams trying to locate obstacles in the waters off an enemy beach, so they can be cleared prior to landing operations.

As a result of all these operational factors, the Navy has a big stake in underwater acoustics. We must be assured that basic research is being done in the many scientific fields which have a bearing on underwater sound, in order that our development programs can keep on devising and perfecting the equipments needed by our submarines, our escort vessels, our minesweepers and our demolition teams.

(*Continued on page 77*)

package job

This story is wrapped up in seven packing cases. They contain the seven sections of the USAF B-61 Martin Matador pilotless bomber.

It is the story of one of the most tradition-shattering pieces of hardware in this world . . . a zero-launch pilotless bomber that can be deployed to any spot on earth—without having ever been previously assembled—and with total interchangeability of parts.

To realize fully the importance of this package job, you should know these things:

...The Matador meets performance requirements more exacting than those of a fighter plane.

...Its instrumentation section alone is one of the most functional single packages ever developed.

...It is built by new Martin-developed processes that are causing basic changes in industry concepts and production methods.

...And it is being delivered at the lowest known cost-per-pound of any military aircraft in production today.

You will hear more about Martin!

MARTIN

BALTIMORE · MARYLAND

From the President

Major General Gordon A. Blake, USAF, our First Vice President, at the meeting of the Board of Directors in New York City on October 29th, discussed AFCEA Chapter activities as follows:

"We must develop a strong chapter organization since that is the dynamic factor in the AFCEA or any similar organization, although top-level direction is, of course, also required.

"We should all work toward better understanding between the national organization and the chapters. I urge each director to visit some of the chapters, setting as a target visits to at least three chapters this season. In making such visits, the director might consider making two speeches, one as a national director, and the other on a subject appropriate to the respective chapter.

"The Board should not make a decision on such matters as raising dues or decreasing the amount of the group member dues rebate to chapters without first discussing these proposals with the chapters.

"We should promote chapter activities in regard to problems of common interest to all chapters, and to all persons interested in the fields encompassed by the Association. Civil Defense is one example. Other similar problems include the shortage of trained communications and electronics engineers, and education as to the necessity for reliability of equipment.

"The importance of chapter contributions to SIGNAL should be stressed. In addition to regular meetings, chapters should be encouraged to sponsor other gatherings appropriate to the local community.

"All of these activities will work toward strengthening the chapters and can best be brought to their attention by personal visits from the directors who would thereby be better informed on the feeling in the chapters on national Association affairs."

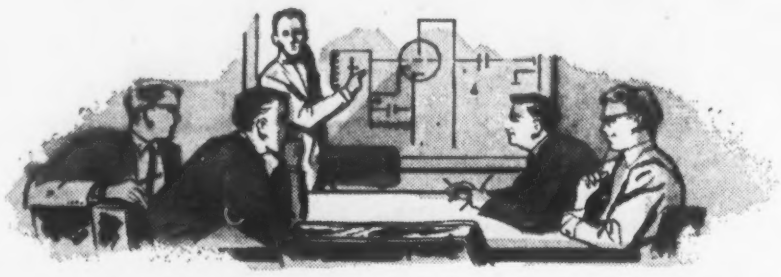
* * *

Your President has made official visits to the following chapters: Boston, Fort Monmouth, Los Angeles, New York, San Francisco, Scott-St. Louis, Southern Connecticut and Washington. It is inspiring to witness the enthusiasm expressed at these meetings and the activities planned for increasing chapter usefulness to the members and the community as well as acquiring new members for AFCEA.

While on the subject, *HAVE YOU INTRODUCED A NEW MEMBER TO AFCEA THIS YEAR?*

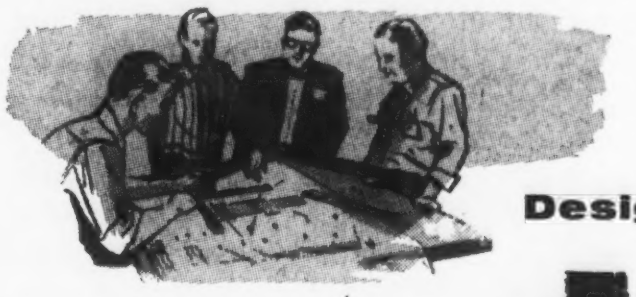
It is not too early to remind you to set aside May 19-20-21 for your visit to the National Convention in New York City. Colonel Ben Oliver, convention chairman, and his committee are actively planning a convention which will be rated "the best ever." Combining, as it does, meetings in New York with instructive exhibits and an interesting Armed Forces Day at Fort Monmouth, it will be an event you should not miss. See you there!

George W. Bowen



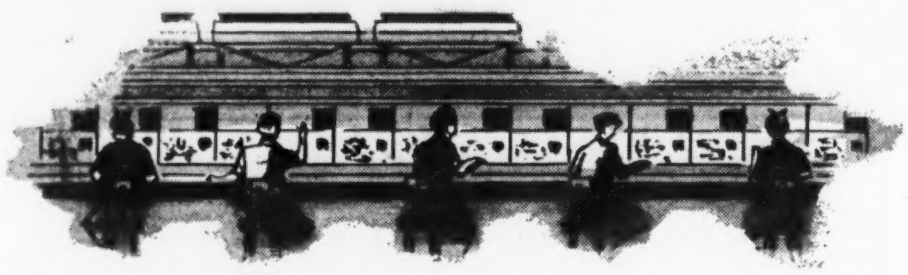
Research

Development



Design

Production



AN INTEGRATED ELECTRONICS OPERATION

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Guided Missiles
Radar
Noise Rejection
Counter Measures
Computers
Communications
Terminal Equipment
Transistors

Hoffman's reputation for getting things done is due, in part, to the unification of Research-Development-Design-Production into one closely integrated electronics operation. At Hoffman—instead of the usual four completely separate operations—one technical director is assigned to co-ordinate each new project from start to finish. Every new project is developed in close cooperation with the divisions ahead, including the practical problems of quantity production. This integration practically eliminates the all-too-common duplications and overlapping of functions, the errors and re-work caused by poor liaison, and materially cuts down the usual time lag between the testing of the prototype and actual production. Hoffman has become a leader in electronics by doing progressively complex jobs—to specifications—to cost estimates—and on schedule.

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Association Affairs

1955 CONVENTION COMMITTEE

Colonel Benjamin H. Oliver, Jr., chairman of the 9th Annual AFCEA Convention, recently announced the convention committee sub-chairmen.

Those named, and their duties, are: John A. Hartman, Hotel Arrangements; J. Z. Millar, Program; Wilfred L. Peel, Finance; Ludwig R. Engler, Registration; Albert C. Holt, Publicity; Harry A. Neimeier, Facilities; Theodore L. Bartlett, Exhibits; Donald F. McClure, Social Hour Arrangements; Henry R. Bang, Banquet; Edwin C. Carlson, Hospitality; Theodore N. Pope, Coordination of Entertainment Arrangements for Guests; Col. Brundy Brown, SigC, Armed Forces, and Col. Joseph E. Heinrich, Fort Monmouth Committee.

Convention committee members are all members of the AFCEA New York or Ft. Monmouth chapters, hosts for the May 19-20-21 meeting.

Adm. Furth Becomes AFCEA Director

In a recent action of the National Executive Committee acting for the Board of Directors, Admiral Frederick R. Furth, USN, Chief of Naval Research, was unanimously elected to the Board of Directors.

Admiral Furth fills the vacancy created when Maj. Gen. Kirke B. Lawton, USA (Ret) resigned at the time of his retirement from the Army in September.

Gen. Back Awarded IRE Fellowship

Major General George I. Back, Chief Signal Officer of the U.S. Army, was among those recently named as a Fellow of the Institute of Radio Engineers.

The grade of Fellow is the highest membership grade offered by the Institute and is bestowed on those who have made outstanding contributions to radio engineering or allied fields.

General Back, cited for his leadership in the field of military communications and communication systems, is the first Signal Corps officer to be so honored while on active duty.

Presentation of the award will be made by the President of the Institute at the Annual Banquet on March 23, 1955 at the Waldorf-Astoria Hotel in New York City during the 1955 IRE National Convention.

Executive Changes at Hallicrafters

Raymond W. Durst, executive vice president, has been elected president, and William J. Halligan, president, has been elected to the newly created post of chairman of the board of the Hallicrafters Company, at the annual meeting of the board of directors.

The new Hallicrafters president, an active member of the AFCEA Chicago Chapter, joined the company in 1936 as executive vice president.

Mr. Halligan, the newly elected chairman of the board and founder of Hallicrafters, served as national president of the AFCEA for the 1951-52 term and presently is a national director of the Association.

Capt. Caswell Named Asst. Director, Naval Communications

Captain Gordon L. Caswell, USN, has been named as the new Assistant Director, Naval Communications.

During World War II he was assigned to the Staff of Commander in Chief, Pacific Fleet, as Communications Officer. From January 1948 to August 1949 he was assigned duty as American Naval Representative at an International Conference on Communications in Switzerland.

Prior to his present assignment, Captain Caswell served as Chief of Staff and Aide to the Commander of the Seventh Fleet and later reported to the Secretary of Defense for duty in the Division of Communications.

Gen. Neal Appointed Consultant By Western Union

The appointment of Brig. Gen. Paul L. Neal as communications consultant was announced recently by the Western Union Telegraph Company.

(*Continued on page 36*)

The mid-year meeting of the AFCEA national Board of Directors was held on October 29th at the headquarters of the Institute of Radio Engineers in New York. A report of the meeting was made in the last issue of SIGNAL. Those who were present at the meeting are: (seated, left tor right) Leslie F. Muter, AFCEA President George W. Bailey, Executive Vice President George P. Dixon, General Counsel Frank Wozencraft, 4th Vice President W. Walter Watts, 3rd Vice President Rear Admiral William B. Ammon, USN, Harry A. Ehle, John A. Whittle, Donald F. McClure, Percy G. Black, Fred E. Moran, Theodore L. Bartlett, Roland C. Davies and Thomas F. Halloran. (Standing, left to right) Vernon B. Bagnall, Past President Joseph R. Redman, Maj. Gen. James D. O'Connell, Sig. C., F. R. Kappel, 1st Vice President Maj. Gen. Gordon A. Blake, USAF, Theodore S. Gary and J. Harry LaBrum.

GUIDE WORDS FOR TODAY

"The sand in the hourglass is running out. The moment of decision between survival of freedom or enslavement under Communism cannot be put off. To try to dodge the responsibility is to favor the enemy.

"Only when the people of your great nation and those of other nations which have already stood side by side in the recent fight against the scourge of the present world — Communism — come to realize that the red menace is a very real threat to their own personal freedoms, can Communism be defeated."

—President SYNGMAN RHEE
Republic of Korea
(in a recorded message dictated July 6, 1954)

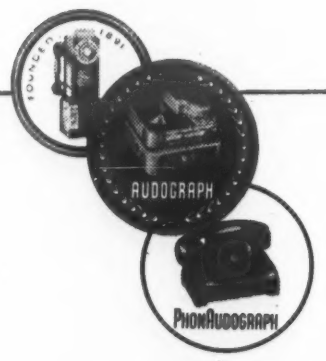
Among those who clamor with advice on *how* to fight Communism, *when* to fight Communism, and even *whether* to fight Communism, there are still a few who *have* fought Communism successfully.

Syngman Rhee is such a fighter, and he knows his enemy well. His words are a clear and timely warning to the entire free world.

If the lessons of history are not learned and followed, history itself becomes a time-bomb. And time is short.

W B Stucart
PRESIDENT

DUTY HONOR COUNTRY
LABOR BUSINESS GOVERNMENT



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Audograph and PhonAudograph "Pushbutton Dictation" Equipment

and Gray Research & Development Co., Inc., Specialists in Video, Audio and Electro-mechanical Devices

ASSOCIATION AFFAIRS

General Neal, who retired recently after over 36 years of distinguished service as one of the top communications experts of the Signal Corps, will be located at Washington, D. C. and will further Western Union's cooperation with the government in providing facilities and services required by the national defense and national security.

From 1947-49 he was commanding officer of the Signal Corps Engineering Laboratories at Fort Monmouth, New Jersey. From 1952 until his retirement General Neal served as Signal Officer, Army Field Forces at Fort Monroe, Virginia.

AFCEA Member Named V. P. of Designers for Industry, Inc.

Patrick E. Lannan, an active member of the Armed Forces Communications and Electronics Association, has been named Vice President of Designers for Industry, Inc., a Cleveland, Ohio, research and development firm.

In addition to his duties as vice president, he will serve as project manager of electronic and electrical development, and as a member of the board of directors.

As a member of the Army Signal Corps during World War II, Mr. Lannan contributed much to development and research in the electrical and electronic fields, and was closely connected with the behind-the-scenes work in the fields of radio, radar, and electronics.

Since joining Designers for Industry, he has directed work on special applications of radio receivers, and very high frequency communications receivers.

Gen. Lawton Elected Director of Gray Manufacturing Company

Maj. Gen. Kirke B. Lawton, USA (Ret), has been elected a director of the Gray Manufacturing Company of Hartford, Connecticut.

He fills the vacancy on the board of directors created by the death early last year of Admiral William H. P. Blandy, USN (Ret).

General Lawton was commandant of Fort Monmouth, New Jersey from 1951 until his retirement in August of 1954. Prior to that assignment he was Deputy Chief Signal Officer of the Army from 1948 to 1951.

COLONEL WOOTTON DECORATED

During a ceremony in the Pentagon Building, Washington, D. C., on November 3, 1954, Major General Gordon A. Blake, Director of Communications, Headquarters United States Air Force, presented the Second Oak Leaf Cluster to the Legion of Merit to Colonel Bernard M. Wootton, USAF.

Colonel Wootton distinguished himself by exceptionally meritorious conduct in the performance of outstanding service to the United States from June 1951 to July 1954 as Director of Communications, Headquarters Northeast Air Command, Pepperrell Air Force Base, Newfoundland.

Colonel Wootton, an AFCEA member, is presently assigned as Chief of the Communications Systems Division, Directorate of Communications, Headquarters United States Air Force.

New DOD Directive on Mobilization Base Maintenance

Recent Amendment Important to Industry

On December 7, 1954, the Secretary of Defense issued a directive covering the Department's new policy on procurement. The purpose of this directive is to integrate Department of Defense procurement policy with industrial mobilization plans in order to maintain a sound mobilization base. This recent order, number 3005.3, supplements Mobilization Order DMO VII-7, as amended.

For the information and reference of our members and readers, the vital portions of the directive are quoted below:

"POLICY

"The referenced document (DMO VII-7) prescribes the Government policy for maintaining the mobilization base. With respect to current procurement, particular attention is invited to paragraph 3A which provides in part:

"1. Procurement agencies shall integrate current procurement with their industrial mobilization plans to the greatest possible extent with the objective of supporting the mobilization base within authorities and funds available.

(*Continued on page* 74)

Life Members of the AFCEA

Lt. Col. John O. Aalberg, USAR
*Maj. Gen. Spencer B. Akin, USA Ret.
Lt. Col. Ollie J. Allen
*Maj. Gen. James B. Allison, USA Ret.
*Rear Adm. William B. Ammon, USN
William H. Angel
*Maj. Gen. Francis L. Ankenbrandt, USAF
Paul Case Armor
*Dr. Allen V. Astin
Arthur Atkinson
Colonel John W. Atwood, USAR
*Maj. Gen. George I. Back, USA
George W. Bailey
Commander Paul S. Bauer, USN
Lieutenant Edward J. Behn, USNR
Colonel Sosthenes Behn
Lieutenant William C. Behn, USAR
Lt. Col. Joseph T. Bernard, USA
*Maj. Gen. Gordon A. Blake, USAF
Harold D. Branstetter
Lt. Col. Wayne O. Brewer
Carl D. Brorein
Captain Edward C. Bryan
Harold C. Burke
Colonel Frank Capra
*Admiral Robert B. Carney, USN
*Captain B. Harold Christenson
†Lieutenant Charles E. Clark
M/Sgt. Thomas C. Clark, USA Ret.
Trevor Clark
Herbert W. Clough
Daniel C. Cole
Lt. Col. Lloyd D. Colvin, USA
Dr. Garrett D. Combs
William B. Cook
B. W. Cooke
Major J. B. Cooperhouse
Major Lawrence J. Corsa
†CWO Charles R. Crank, USA
Dr. Lee de Forest
William C. DeVry
Mevio DiMeglio
David M. Dixon
Lt. Col. Ernest E. Ferguson, USAR
Colonel S. P. Fink, USAR
*Captain Harry E. Fisher
John A. Fitch
Lt. Col. Merwin B. Forbes
†Lt. Col. James E. Foster, USA
Dow I. Galloway
Captain William L. Gause
Colonel Ira H. R. Genet, USAR
Lt. Col. Charles W. Gibbs, USA
Colonel David P. Gibbs, USA
†Major Arthur B. Gibson, USA
Robert W. Glahe
Joseph Gorodiz
*Captain Wilfred B. Goulett, USN
Major Myron J. Green, USA
Dan Greene
Owen Griffiths
Captain Laurence W. Hacker
Lt. Col. Max W. Hall, USA
W. J. Halligan
Harold C. Hammerly
Lt. Col. Richard B. Hearn, USA
Francis S. Heath, Jr.
Lt. Col. Edward W. Heffner, USAR
Colonel William S. Henry, AUS Ret.
Robert C. Herrick
Charles T. Hibbard
Colonel Boyd B. Hill, AUS Ret.
*Rear Adm. Stanford C. Hooper, USN Ret.
Captain Joseph E. Houk, USAR
*Maj. Gen. H. C. Ingles, USA Ret.
Alexander H. Jackson
Major John F. Jenkins, USA
Lt. Col. John G. Johnson, USA
†Howard Kaplan
H. Donn Keresey
Major Albion W. Knight, Jr., USA
Colonel J. Harry LaBrum, USAR
Frederick R. Lack
*Maj. Gen. Francis H. Lanahan, USA
Captain Elmer S. Lesher, USA
*Maj. Gen. Harold M. McClelland, USAF Ret.
William J. McIlvane
John Richards MacKay
Col. Thomas H. Maddocks, USA Ret.
Capt. Gabriel W. Marnoch, Jr., USAR
Brig. Gen. Alfred W. Marriner, USA Ret.
*Maj. Gen. J. O. Mauborgne, USA Ret.
*Maj. Gen. Raymond C. Maude, USAF
*Maj. Gen. Lucien Merlin, LH, LM, CBE
I. Allen Mitchell
Capt. Louis Crockett Mohler, USAR
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Captain Thomas C. Musgrave, USA
Lt. Col. Jack N. Nahas, USA
Lt. Col. B. I. Noble, USAR
Lt. Col. Wm. V. Norton, USAR
Lt. Col. Edward H. Olsen, USA
John K. Palijas, Jr.
W. H. Parkin
Gerald Dayton Post
Colonel Van Ness Philip, AUS Ret.
Dr. Boris Pregel
Major Joyn B. Prestidge, USAFR
Lt. Col. Emro J. Quashnock
*Admiral Arthur W. Radford, USN
*Rear Adm. John R. Redman, USN
*Rear Adm. Joseph R. Redman, USN Ret.
Marcel C. Reeds
Eugene H. Reitzke
Colonel George W. Rhyne
*General Mathew B. Ridgway, USA
Major Thomas M. Rienzi, USA
Thomas A. Riviere
George C. Ruehl, Jr.
Brig. Gen. Peter C. Sandretto, USAFR
Brig. Gen. David Sarnoff, USAR
Lt. Col. William Buell Scace, USAR
Major James F. Scoggin, Jr., USA
Colonel Henry H. Scudder
Captain Leroy W. Sellek, USA
*General Lemuel C. Shepherd, USMC
Lt. Col. Dale H. Shick, USA
Nicholas A. Sica
Lt. Philip Y. Simpson, Jr., USAFR
Lt. Col. Eugene E. Skinner, USAF
Captain Rene G. Smoller
John T. Snodgrass, Jr.
Edward J. Staubitz
Colonel Andrew D. Stephenson, USA
*Rear Adm. Earl E. Stone, USN
Lt. Col. Arthur W. Tager, USAR
*Air Marshall Sir Victor Tait, KBE, CB
Colonel Samuel R. Todd, USA Ret.
Brig. Gen. Terence J. Tully, USA Ret.
*General Nathan F. Twining, USAF
Capt. Walter N. Vincent, AUS Ret.
Lt. Frank C. Vondrasek, Jr., USA
Maj. Gen. C. H. H. Vulliamy, CBE, DSO
*Maj. Gen. D. A. L. Wade, CB, OBE, MC
Lt. Col. Leonard F. Walker, USA
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Colonel Jack M. Warner, USAR
Col. David E. Washburn, USA Ret.
Major Hubert F. Wehlitz, USAR
Major Virgil J. Wennergren
Major George W. White, USAF
Lt. David L. Wiesen, USA
Lt. Col. Harold C. Williams, USA
Col. Robert Owen Williams, USAR
William H. Winings
Major William F. Wisner
Col. Frank W. Wozencraft, USAR
Capt. John M. Wozencraft, USA
Capt. Ernest G. Wunderlich, USAR
Colonel Darryl F. Zanuck, USAR

**Honorary Life Members* †*Present Address Unknown*

This is the first time in several years that a list of AFCEA Life Members has been published. If any errors or omissions are noted, please send the corrections, and present addresses where known, to the Editor. *See page 8 for further information about AFCEA Life Membership.*

AFCEA Group Members

Communications—Electronics—Photography

Listed below are the firms who are group members of the Armed Forces Communications and Electronics Association. By their membership they indicate their readiness for their share in industry's part in national security. Each firm nominates several of its key employees or officials for individual membership in AFCEA, thus forming a group of the highest trained men in the electronics and photographic fields, available for advice and assistance to the armed services on research, development, manufacturing, procurement, and operation.

Acme Telectronix
Admiral Corporation
Air Associates, Inc.
Aircraft Radio Corp.
Allied Control Co., Inc.
Allied Radio Corporation
Almo Radio Company
American Cable & Radio Corp.
American Institute of Electrical Engineers
American Machine & Foundry Co.
American Phenolic Corporation
American Radio Relay League
American Telephone & Telegraph Co.
Ampex Electric Company
Anaconda Wire & Cable Company
A. R. F. Products, Inc.
Argus Cameras, Inc.
Arnold Engineering Company
Atlas Precision Products Co.
Audio Products Corporation
Automatic Electric Company
Automatic Electric Sales Corp.
Automatic Telephone & Electric Co., Ltd.
Barry Corporation, The
Bell Telephone Company of Pa.
Bell Telephone Laboratories, Inc.
Bendix Radio
Berkshire Transformer Corp.
Bliley Electric Company
Breeze Corporations, Inc.
*Bruno-New York Industries Corp.
Burnell & Company
California Water & Telephone Co.
Cambridge Thermionic Corp.
Capehart-Farnsworth Co.
Capitol Radio Engineering Inst., Inc.
Cargo Packers Inc.
Carolina Telephone & Telegraph Co.
Central Technical Institute
Chesapeake & Potomac Tel. Co.
Cincinnati & Suburban Bell Tel. Co.
Collins Radio Company
Copperweld Steel Company
Cornell-Dubilier Electric Corp.
*Craig Machine, Inc.
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Designers for Industry, Inc.
De Vry Corporation
Diamond State Telephone Co.
*Dictaphone Corporation
Downing Crystal Company
Dukane Corporation
DuMont, Allen B., Laboratories, Inc.
Eastman Kodak Company
Electronic Associates, Inc.
Elgin Metalformers Corporation
Espey Manufacturing Co., Inc.
Federal Telecommunication Laboratories
Federal Mfg. and Engineering Corp.
Federal Telephone & Radio Corp.
General Aniline & Film Corp.
General Cable Corporation
General Communications Co.
General Electric Company
General Telephone Corp.
General Transformer Co.
Gilfillan Bros., Inc.
Globe Wireless, Ltd.
Gray Manufacturing Co.
Guardian Electric Mfg. Co.
Hallicrafters Company, The
Haloid Company
Hammarlund Manufacturing Co., The
Hazeltine Electronics Corp.
Heinemann Electric Company
Hercules Motor Corp.
Hitemp Wires, Inc.
Hoffman Laboratories Incorp.
Hopkins Engineering Co.
Hughes Aircraft Company
Illinois Bell Telephone Co.
Indiana Bell Telephone Co.
Indiana Steel & Wire Co.
Institute of Radio Engineers
International Business Machines
International Resistance Co.
International Tel. & Tel. Corp.
Jacobsen Manufacturing Co.
Jansky & Bailey, Inc.
Kellogg Switchboard & Supply Co.
Keystone Electronics Co.
Kleinschmidt Laboratories, Inc.
Lavoie Laboratories
Leich Sales Corporation
Lenz Electric Manufacturing Co.
Lewyt Corporation
Librascope, Inc.
Loral Electronics Corporation
Machlett Laboratories, Inc.
Magnavox Company
Maida Development Company
Mallory, P. R., & Co., Inc.
Merit Coil and Transformer Corp.
Michigan Bell Telephone Company
The Montgomery Company
Motorola, Inc.
Mountain States Tel. & Tel. Co.
Muter Company, The
Mycalex Corporation of America
National Company, Inc.
Nelson Technical Enterprises
New England Tel. & Tel. Co.
New Jersey Bell Telephone Company
New London Instrument Co.
New York Telephone Company
Northwestern Bell Telephone Co.
Oak Manufacturing Co.
Ohio Bell Telephone Co.
O'Keefe & Merritt Company
Otis Elevator Co., Electronic Division
Pacific Mercury Television Mfg. Corp.
Pacific Telephone & Telegraph Co.
Phebco, Inc.
Philco Corporation
Photographic Society of America
Pickering & Company, Inc.
*Polytechnic Research & Development Co., Inc.
Precision Apparatus Co., Inc.
Plessey Company, Ltd., The
Prodelin Inc.
Radiart Corporation
Radio Condenser Company
Radio Corporation of America
Radio Engineering Laboratories Corp.
Radio Frequency Laboratories, Inc.
RCA Photophone, Ltd.
RCA Victor Division
Radio Receptor Company
Raymond Rosen Engineering Products, Inc.
Ray-O-Vac Company
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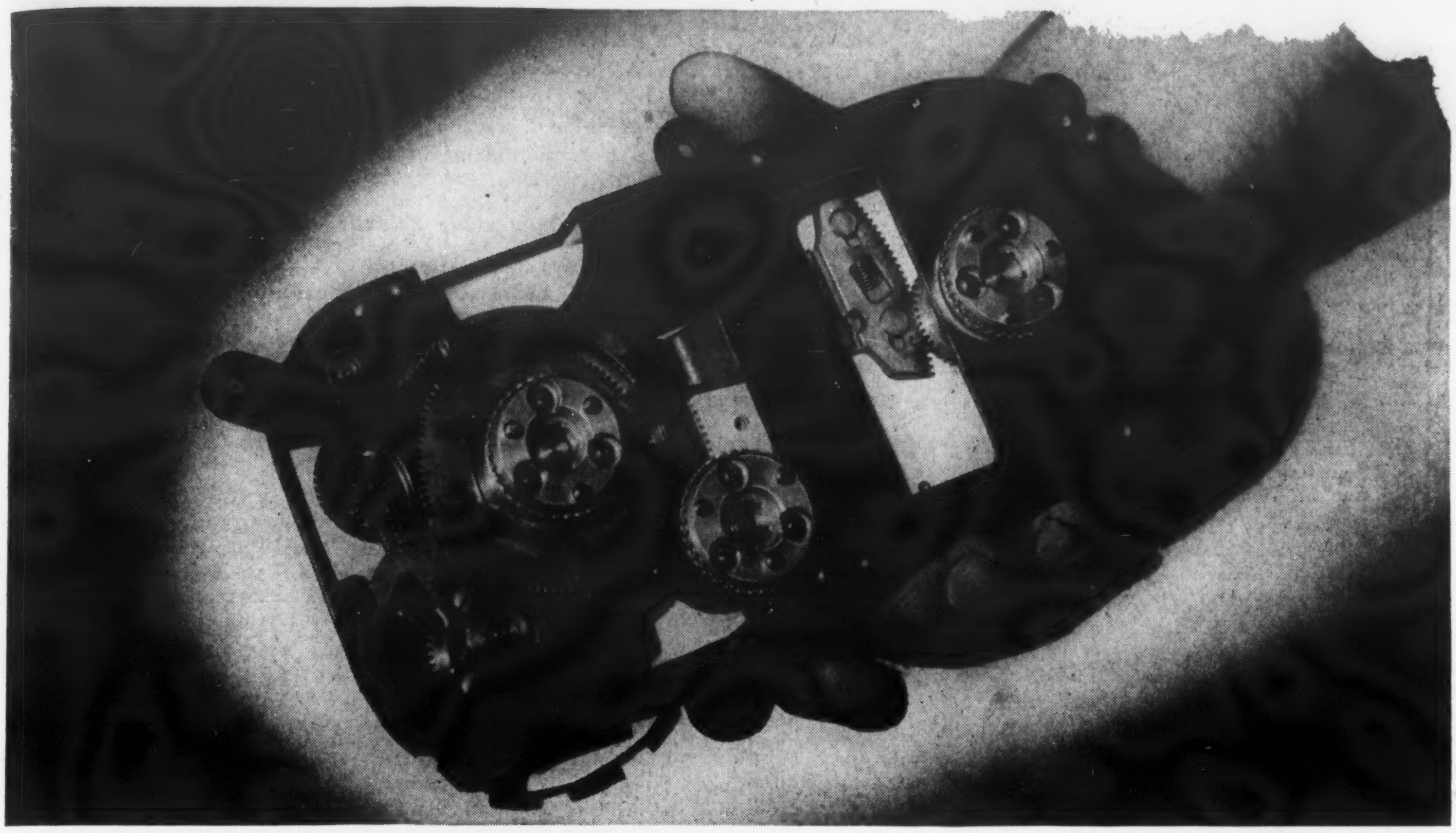
Red Bank Division Bendix Aviation Corp.
Reeves Instrument Corp.
Remington Rand, Inc.
Remler Company, Ltd.
Saxonburg Ceramics
Seeburg, J. B. Corporation
Simmon Brothers, Inc.
Society of Motion Picture & Television Engineers
Sonotone Corporation
Soundscriber Corp.
Southern Bell Tel. & Tel. Co.
Southern New England Tel. Co.
Southwestern Bell Telephone Co.
Sparton Radio-Television Division, Sparks-Withington Co.
Sperry Gyroscope Company
Sprague Electric Company
Stackpole Carbon Company
Standard Coil Products Co., Inc.
Standard Piezo Co.
Standard Telephone & Cables, Ltd.
Stanford Research Institute
Stewart-Warner Corporation
Stromberg-Carlson Co.
Sylvania Electric Products, Inc.
Talco Engineering Co., Inc.
Telephone Services, Inc.
Telephonics Corporation
Teletype Corporation
Texas Instruments, Inc.
Times Facsimile Corporation
Trad Television Corp.
Triad Transformer Corp.
Tung-Sol Lamp Works, Inc.
United States Rubber Company
United Telephone Co.
United Transformer Co.
Voltz Brothers, Inc.
Waterman Products Co., Inc.
West Coast Telephone Co.
Western Electric Company, Inc.
Western Union Telegraph Co.
Westinghouse Electric Corp.
Weston Electrical Instrument Corp.
Whitney Blake Co.
Wickes Engineering & Construction Co.
Wilcox Electric Co., Inc.
Willard Storage Battery Company
Wisconsin Telephone Company
Wollensak Optical Company
York-Hoover Corporation
Zenith Radio Corporation

*Company accepted for AFCEA Group Membership since the last issue of SIGNAL.



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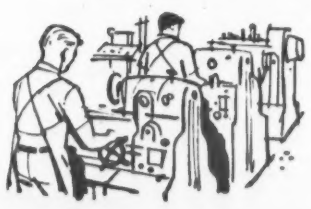

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Region B: George C. Ruehl, Jr., 2118 St. Paul St., Baltimore, Md. *Delaware, District of Columbia, Kentucky, Ohio, Pennsylvania, West Virginia and Virginia.*

Region C: Ralph S. Grist, So. Bell T&T Co., Atlanta, Ga. *Southeastern States along Atlantic and Gulf coasts — from North Carolina to Louisiana including Tennessee.*

Region D: Col. George L. Richon, Hq. Fourth Army, Fort Sam Houston, Tex. *New Mexico, Texas, Oklahoma, Arkansas.*

Region E: T. S. Gary, 1033 W. Van Buren St., Chicago, Ill. *Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, North Dakota, South Dakota, Wyoming, Colorado.*

Region F: Col. Lloyd C. Parsons, 1807 16th Ave., San Francisco, Calif. *Arizona, Utah, Nevada, California, Idaho, Oregon, Montana and Washington.*

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CAYUGA: President—Donald T. Olmstead, GE Advanced Electronics Center, Cornell University, Ithaca, N. Y. Secretary—R. O. McCary, GE Advanced Electronics Center.

CHICAGO: President — Fritz Franke, Hallicrafters Co., 4401 W. Fifth St., Chicago, Ill. Secretary—Henry J. McDonald, Kellogg Switchboard & Supply Co., 6650 So. Cicero St., Chicago, Ill.

CLEVELAND: Secretary—T. F. Peterson, 1434 Union Commerce Bldg., Cleveland, Ohio.

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DECATUR: President—Col. Edwin G. Fritz, Decatur Signal Depot, Decatur, Ill. Secretary—David W. Richardson, 1075 West King, Decatur, Ill.

EUROPEAN: Inactive.

FORT MONMOUTH: President — Col. John C. Monahan, TSS, Fort Monmouth, N. J. Secretary—Lt. Col. Oscar C. Buser, TSS, Fort Monmouth.

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GULF COAST: President — James C. Dabney, Southern Bell T&T Co., Gulfport, Miss. Secretary — Rodney M. Van Loon, 20 Peters Ave., Biloxi, Miss.

GREATER DETROIT: President—Paul J. Schafer, 5656 Hillcrest, Detroit, Mich. Secretary—J. R. Saxton, Michigan Bell Telephone Co., 305 Michigan Ave., Detroit, Mich.

HAWAII: President—Capt. Richard E. Elliott, USN, DCO, Navy 128, S. F. Secretary—Lt. Cdr. Charles E. Ross, 148 Kaukama St., Lanikai, Oahu, T.H.

KANSAS CITY: President—Carleton L. Buell, Western Union, 114 E. 7th St., Kansas City, Mo. Secretary—E. L. Parkington, Western Union, 114 E. 7th St., Kansas City.

KENTUCKY: President—Col. Fred W. Kunesh, Lexington Signal Depot, Lexington, Ky.

LONDON: President — Cornelius G. Mayer, 55 Pall Mall, London S.W. 1. Secretary—Capt. Harold E. Ruble, Box 8, FPO 100, N. Y.

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RIO: President—Herbert H. Schenck, Caixa Postal 709, Rio de Janeiro, Brazil.

ROCHESTER: President—John Whittle, Eastman Kodak Co., 343 State St., Rochester, N. Y.

SACRAMENTO: Inactive.

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SOUTHERN CONNECTICUT: President—Edgar L. Love, 175 Dessa Drive, Hamden, Conn. Secretary—R. E. Nelson, Machlett Laboratories, 1063 Hope St., Springdale, Conn.

SOUTHERN VIRGINIA: President—Col. Robert F. Frost, DSC Communications, TAC, Langley AFB, Va. Secretary—Leo F. Zakowski, Off. of DCS/Comm., Hq. TAC, Langley AFB, Va.

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TOKYO: President—Capt. F. C. B. Jordan, USN, COMNAVFE, N-5 FPO, S.F. Acting Secretary — Capt. Lawrence E. Echelmeyer, 1808th AACS Wing, APO 925, S.F.

WASHINGTON: President—Frank W. Wozencraft, 1425 H St., N.W., Washington, D. C. Secretary—M. C. Richmond, Western Electric Co., 1625 Eye St., N.W., Washington, D. C.

ACTIVE STUDENT CHAPTERS

Iowa State College, Ames, Iowa
Northeastern University, Boston, Mass.
Norwich University, Northfield, Vt.
Pennsylvania State College, State College, Pa.

National Headquarters Chapters Secretary: Julia B. Godfrey

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From raw material to finished product under one roof!

1 Bar stock, sheet metal, wire and other raw material for the Receiver-Transmitter RT-66/GRC is cut to size for cases, chassis, gears and other Lewyt-made components.

2 Jig-borers in Lewyt's large Tool and Die Department turn out precision tools to guarantee top quality parts when RT-66 is mass-produced.

3 Special Lewyt-designed machines cut costs and speed up production. This one automatically drilled and tapped over a million holes in RT-66 condenser parts.

4 Lewyt's engineering versatility enables it to make over 75% of the components for the RT-66 — variable capacitors, coils, chokes, transformers and most of the mechanical parts.

5 As chassis take shape, Lewyt's quality control system goes to work. Here a sample sub-assembly is checked to insure conformance with process quality level.

6 Central control system delivers crystal controlled frequencies and frequency response curves to 28 RT-66 test positions to assure uniform performance of final unit.

The RT-66 Receiver-Transmitter is typical of the jobs Lewyt has done for all branches of the Armed Services.

By making many of its own components instead of buying them, Lewyt is able to control quality, maintain delivery schedules and keep costs down through elimination of "double profits".

Lewyt has been a Government Contractor in war and peace since 1914. It keeps 1800 trained workers on its assembly-lines at all times — busy in peace, ready overnight for emergency production should the need arise.

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Chapter News

Atlanta

A lecture-demonstration by Dr. M. E. Strieby of the American Telephone and Telegraph Company, entitled "50,000 Hands—A Story of Telephone Switching," featured the November 17th meeting of the Atlanta Chapter.

A highlight of Dr. Strieby's presentation was a long distance call over the equipment to the New York Chapter meeting at the Belmont Plaza Hotel in New York City. Loud speakers were connected to the equipment so that the membership of both chapters could hear the exchange of greetings between Kelly Mosley, Atlanta Chapter president, and George Bailey, National President of the association.

The dinner-meeting was held at the Fort McPherson Officers' Club. A few musical numbers presented by two young ladies from the Southern Bell Telephone Company rounded out the evening's program.

Atlanta Chapter's November meeting was addressed by Dr. M. E. Strieby of the AT&T. At left, President Kelly Mosley places a long distance call over the lecture-demonstration equipment to the New York Chapter meeting while Dr. Strieby looks on.

Augusta-Camp Gordon

The chapter staged an informal gathering at Carolina Springs on October 21st. The main event was a catfish stew prepared under the supervision of Francis Saxon.

After a brief business session, at which Col. George Lennox was appointed chairman of the nominating committee, the meeting was adjourned to the fireside for the remainder of the evening.

The chapter's annual elections were held on November 11th, with Col. Otto T. Saar, commandant of The Southeastern Signal School, chosen as the new president. Brig. Gen. S. P. Collins, commanding general of the Signal Corps Training Center, and W. O. McDowell, retiring chapter president, were named honorary presidents.

Other chapter officers are: vice-presidents: J. C. Woodward, G. W. Simms, and Lt. Col. Lowrey R. Moore; secretary—Lt. Col. Stephen S. Furse; treasurer—James M. Williams. Directors: Lt. Col. John C. McIntyre, Lt. Col. Edward R. Stephenson, Maj. A. D. Melvin, M/Sgt Allen R. Klein, P. R. Caldwell, Jewett Harris, Col. W. D. Harden and F. A. Saxon.

Lt. Col. Bertie L. Avera and Mr. McDowell were elected to represent the chapter on the National Council.

Following the elections, a unanimous vote of thanks was accorded Mr. McDowell for his splendid leadership during the past year.

The new officers were installed on December 2nd at a dinner-meeting at Timmerman's in Augusta.

Committees for the coming year were appointed by Col. Saar, the new president, as follows:

Program committee: 1st quarter—Col. D. L. O'Roark, Maj. Paul Greksa, P. R. Caldwell; 2nd quarter—P. R. Caldwell, Dick Sims, Maj. H. B. Raff; 3rd quarter—Dick Sims, J. M. Harris, O. S. Niehuss; 4th quarter—Maj. H. B. Raff, O. S. Niehuss, Maj. R. M. Tarr.

Membership committee: Col. T. A. Pitcher, Col. R. W. White, Lt. Col. J. C. McIntyre, Capt. G. M. Hemsley, F. A. Saxon, Walter Neeley.

House committee: Maj. E. E. Lehman, Maj. P. Moore, J. M. Williams, Maj. J. A. Clark, John Brown.

Civil defense committee: Lt. Col. L. R. Moore, Lt. Col. S. S. Furse, Lt. Col. C. R. Williams, F. A. Saxon.

Baltimore

A tour of the Baltimore Police Department communications division was the highlight of the chapter's October 19th program.

First meeting for dinner at the House of Welsh, the 105 members and guests were welcomed by Inspector Taylor, host for the Police Department program, who described briefly some of the highlights of the tour to follow.

Chapter President Don Lee commended the members for the interest shown at the monthly meetings. He introduced the guests at the head table as follows: Adm. W. E. Cleaves of Bendix Radio; Capt. Purcell and Sgt. Young of the Maryland State Police; Col. George Dixon, AFCEA Executive Vice President; Col. A. H. Anderson, commanding officer, Tobyhanna Signal Depot; Col. C. M. Baer and Lt. Col. F. R. Corson of Fort Meade; and John M. Pearce, Phebco, Inc.

Col. Dixon reported on the national activities of the association and also complimented the chapter on the fine turnout at the meeting.

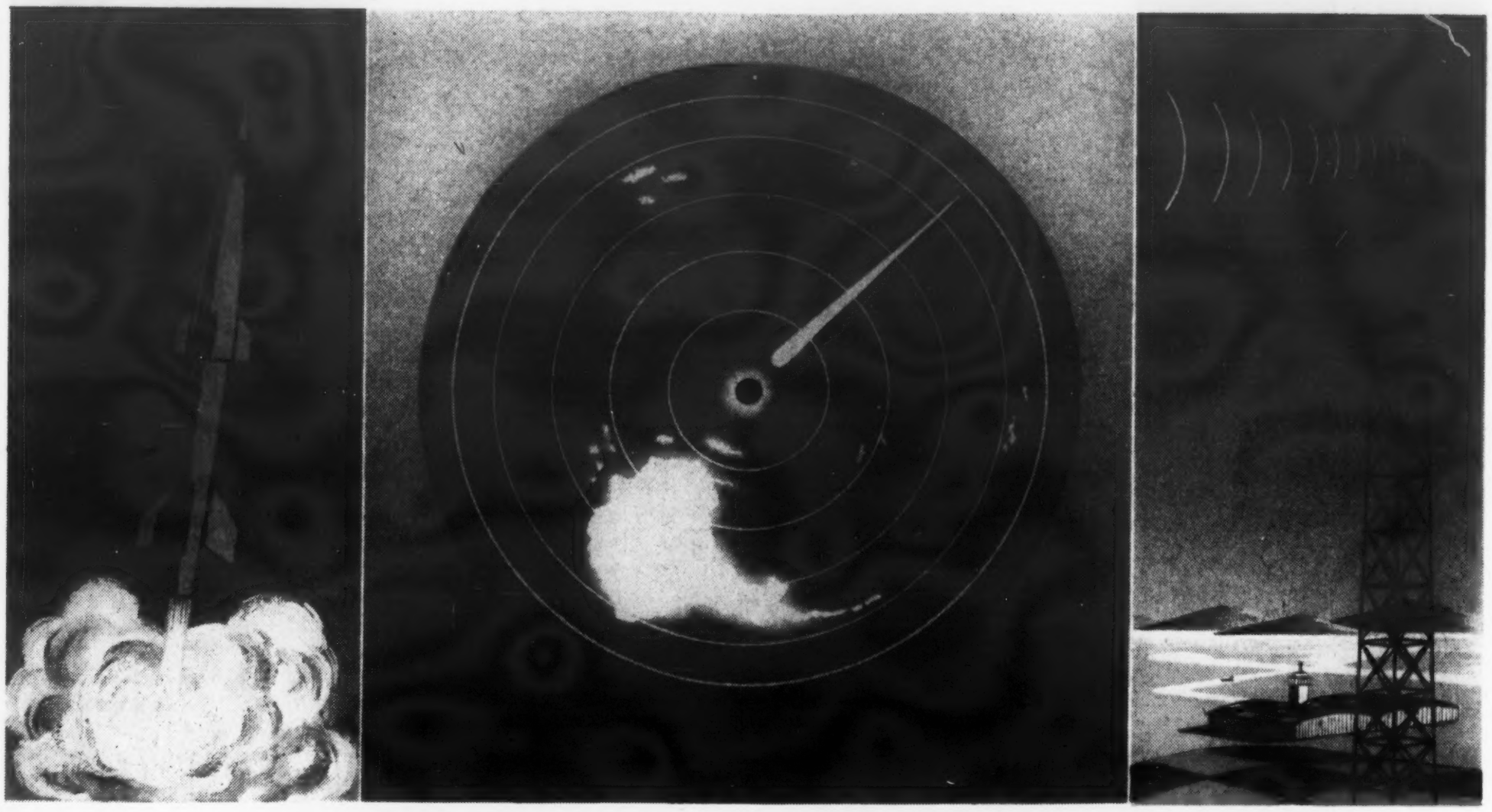
During the very interesting tour of the Central Police Department, the members witnessed the operation of the radio room, where communications between police headquarters and radio cars are handled, and saw how calls from patrol boxes are recorded on tape. The Central Records Bureau, where records dating back many years are kept on file in microfilm form, was also visited by the group.

Boston

A joint meeting with the local section of the Armed Forces Chemical Association was held on November 18th at the Hotel Somerset.

Featured speaker was Major General William M. Creasy, Chief Chemical Officer, U. S. Army, who discussed the mission of the Chemical Corps, and conducted a question and answer period at the conclusion of his talk.

A concentrated drive for additional



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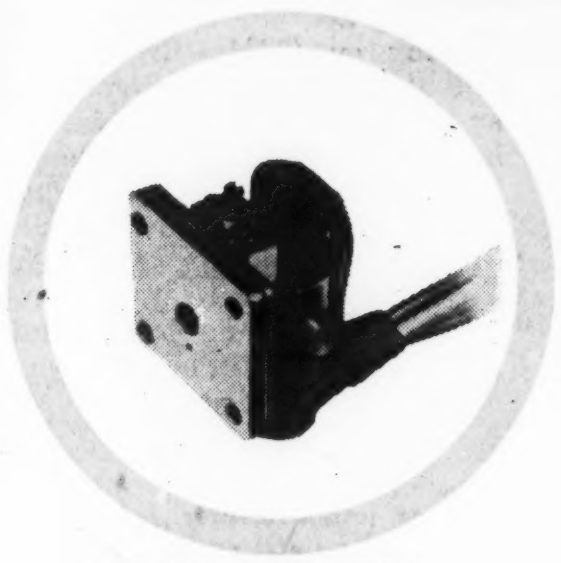

TYPICAL OPERATION

Frequency	*16.5 kmc*
Resonator Voltage	*300 v*
Resonator Current	*38 ma*
Reflector Voltage	*−150 v*
Power Output (VSWR < 1.1)	*40 mw*
Electronic Tuning	*65 mc*

Varian now offers the most advanced reflex klystron ever developed for airborne radar local oscillator and beacon service. *The VA-94* provides a minimum power output of 20 mw throughout its range of 16 to 17 kmc . . . to give you absolutely reliable operation at any altitude without pressurization.

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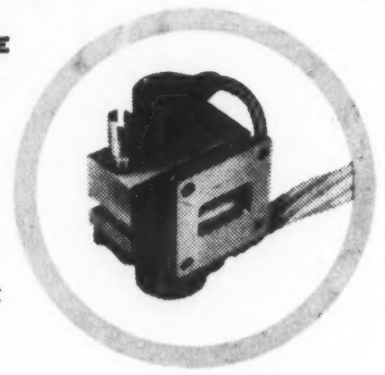

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members is being conducted under the direction of Robert A. Rivers, chairman of the membership committee. A new group member recently added to the chapter's rolls is Craig Machine, Inc., of Danvers.

Cayuga

Brig. Gen. Tom C. Rives, USAF (Ret.), Manager, Laboratories Department, Electronics Division, General Electric Company, was guest speaker at the chapter's November meeting.

A charter member and director of the Cayuga Chapter, General Rives gave an interesting account of the history of the association, tracing its origin to the days following the War between the States. He stressed the aims and objectives of the AFCEA and pointed out that it fills a definite place in the armed services and in industry in its three fields of interest.

Chicago

The series of fall meetings of the Chicago featured diversified programs. Detailed reports, however, had not been received at national headquarters as SIGNAL went to press.

The first meeting of the season was held at the Hallicrafters Company plant, with William J. Halligan, president of Hallicrafters and a past president of the association, host for the evening. A tour of the plant and facilities followed the dinner and meeting.

Brig. General Walter B. Larew, Chief, Army Communications Service Division, Office of the Chief Signal Officer, was the principal speaker at the October 28th meeting which was held at Fifth Army Headquarters. Col. Marlin S. Moody, Fifth Army Signal Officer, was host. Members had an opportunity to visit the new communications center in Fifth Army Headquarters where a fully automatic teletype tape relay station is maintained.

The new offices and plant of Standard Coil Products Co., Inc., in Melrose Park, were the scene of the December 2nd meeting. Mr. James O. Burke, Executive Vice President and Treasurer, welcomed the chapter and briefed the members on the history of the company. The numerous items manufactured by Standard Coil Products were on display and plant tours were conducted after the meeting.

The chapter has launched a membership drive under the chairmanship of Donald A. Nelson of Nelson Technical Enterprises, Inc. The campaign is already showing excellent results.

Dayton-Wright

To determine the scope of service it can render to the local Civil Defense efforts, the Dayton-Wright Chapter devoted its October 20th meeting to the subject of Civil Defense, with four authoritative speakers on the program. The speakers were: Honorable Henry S. Stout, Mayor of the City of Dayton; Col. J. C. Gault, Director of Miami Valley Civil Defense Authority; Maj. E. C. Welch, Wright-Patterson Air Force Base; and Donald Hapner of Station WHIO.

In introducing the program, Art Lord, Chairman of the chapter's Civil Defense Committee, reported on the efforts being made by the AFCEA National Advisory Committee on Civil Defense, and expressed the hope that the meeting would be instrumental in defining the role of the Dayton-Wright Chapter in the local area.

Mayor Stout defined "The Duty of the Civilian in Civil Defense" as first taking a realistic view of the possibilities of enemy attack and then making every effort to build up a corps of trained Civil Defense organizations.

Colonel Gault's subject was "Is there a solution to the Hydrogen Weapon" and "Wright-Patterson Air Force Base operation and effect on military and civil population." He emphasized that numerous problems with labor, population, government and family must be solved before attempting a mass evacuation. He also suggested several ways in which the chapter could be of assistance.

Don Hapner explained Conelrad and its objectives and described the function of the radio station in an emergency. Major Welch discussed the role of WPAFB in the local Civil Defense plans.

Guests of the chapter were: Dr. J. V. Cerney, P. I. O. for Civil Defense; Mr. Cosby, air raid warden; Donald Batten, Chamber of Commerce; Bill McGee, assistant to Col. Gault; Miss Mary Ellen Wolf, Dayton Journal Herald; Robert B. Shore, Asst. Director of MVCDA, and Mrs. Shore.

The chapter's next meeting was on the subject of Electronic Countermeasures (ECM) and was held at Wright Patterson AFB on November 15th.

Distinguished guests included Rudolph Gagg, Undersecretary to the Secretary of Defense; Col. Mercer, Washington, D. C.; Maj. Sawnders, Offitt AFB, Omaha; Col. George Dixon, AFCEA Executive Vice President; Col. and Mrs. D. R. Longino; Col. and Mrs. Gould; Col. H. A. Boushey; General Thurman, Col. Gibbons, N. R. Rosengarten, Col. Damberg, Col. Martin and Col. Wilson of WPAFB; W. H. Rous, Vice President, American Phenolic Corp.; and David Higgins, Vice President, Hallicrafters, Inc.

Following a social hour and dinner at the Officers Club, those with confidential clearance were transported to Building 262 for a vitally interesting meeting on ECM. Brig. Gen. C. H. Mitchell opened the program, followed by Col. Frank J. Shannon, Sr., who acted as master of ceremonies. He introduced Maj. John Paul who gave a presentation on ECM and showed a film on the subject. Questions from the floor were answered by a panel consisting of Majors John Paul, Jack Eich, Joseph McPhie, Jerome Jones and John Thompson, and Mr. Glen Nesbitt.

Scenes from Baltimore Chapter's tour of the communications division, Baltimore Police Department. At left, Inspector Taylor explains an item of interest to Col. A. H. Anderson, then CO of Baltimore Signal Depot, and Chapter President Don Lee (left) and Adm. W. E. Cleaves of Bendix (right). Photo at right shows the central switchboard where all calls come in from police call boxes and cruising cars.

Above, left, shows Vice President Henry Malone presenting award of appreciation from the Decatur Chapter to Col. Frank Schaal, chapter president, upon his retirement. Photo at right shows George H. Fathauer of Dage Electronics demonstrating a Dage television camera during a recent meeting, while Henry Malone looks on.

While the men took part in the serious aspects of the meeting, the ladies enjoyed a card party at the Officers Club.

The transfer of the Roy Merwins (live-wire chapter president and secretary) to Syracuse in December created several changes in the chapter organization. Vice-president Harry C. Blackburn, Sylvania Electric Products, succeeded to the presidency, Allan F. Schmahl, Sylvania, was named third vice-president, and Mrs. Kitty Thompson was appointed secretary-treasurer.

At the same time, the following were elected as additional members of the board of directors: Brig. Gen. V. R. Haugen, WADC, and Maj. John W. Thompson, AMC.

Decatur

A program on closed circuit television systems was presented at the chapter's October 28th meeting by George H. Fathauer, television engineer of Dage Electronics, division of Thompson Products. Mr. Fathauer used a Dage television camera to demonstrate his lecture, and at the conclusion of the program, conducted a question and answer period.

A nominating committee consisting of James Buck, William Garland and Herman Tille, was appointed by Vice President Henry E. Malone who was acting as president of the chapter since the retirement of Col. Frank Schaal.

On the eve of Col. Schaal's departure from the Decatur Signal Depot, the chapter presented him with a special certificate of appreciation "for his contributions and untiring efforts in promoting the local program for advancement in the communications, electronic and photographic fields."

Twenty-two members of the television school being conducted at the Decatur Signal Depot were guests of the chapter for the evening.

A film showing the Philippine campaign during World War II was the program feature of the November 18th meeting at the Decatur Signal Depot.

During the business session, Vice President Herbert Senger reported plans for the new television school to be sponsored by chapter. The course will cover the theory of television, and enrollment will be limited to thirty members in each class. The cost will be approximately $6.00 and will cover books and materials. Classes will be held on Tuesday and Thursday evenings and will last for three hours.

Col. Edwin G. Fritz, commanding officer of the Decatur Signal Depot, was elected president of the chapter during the annual elections held at the December 16th meeting.

Other officers elected were: Richard R. Crum, 1st vice president; Roman W. Wojcicki, 2nd vice president; David W. Richardson, secretary-treasurer; Robert M. Burns and Adolph H. Hetzler, directors.

The program consisted of two films on the Italian and Japanese campaigns of World War II.

Detroit

On December 13th, Detroit Chapter members visited the Motorola-Detroit Company for a plant tour and a lecture-demonstration on color television.

Oscar Kusisto, color television authority, conducted the lecture-demonstration. The keen interest aroused by his program was evidenced by the lively and lengthy question and answer period which followed.

Among those in attendance at the meeting were representatives from Selfridge Field, the Air Division, CAA, Corps of Engineers, Ford Motor, Michigan Bell Telephone, Western Union, etc.

Prior to the meeting, members and guests met for dinner at Charley Harris' Manor in Detroit.

Far East

The Far East Chapter held a luncheon at the Rocker Four Club, Tokyo, on October 21st, with a total attendance of 161. The meeting was emceed by Major Carlson and presided over by Brig. Gen. A. F. Cassevant, first vice president.

Brief talks were given by Capt. W. L. Pryor, USN, who spoke on behalf of Capt. F. C. B. Jordan, chapter president who was absent on a tour of duty; Col. C. J. Harrison, USAF, second vice-president; and Preston Shivers, Philco, third vice-president. All speakers were gratified to see such a fine turnout, and Col. Harrison accepted, on behalf of USAF members, sponsorship of the next general meeting to be scheduled in January.

General Cassevant explained that the executive committee had decided at their last meeting that the majority of routine business should be conducted by the committee, thus allowing members to enjoy a planned program at the general meetings each quarter. He then introduced the one item of business on the agenda for the day: the present unsatisfactory organizational structure whereby the Far East Chapter theoretically covers the Far East military jurisdiction, and where one defunct Tokyo Post is carried under the chapter. To correct this undesirable situation, the membership voted unanimously that (a) the Far East Chapter and its Tokyo Post be deactivated; (b) a new Tokyo Area Chapter be activated; and (c) elected and/or appointed officers of the Far East Chapter continue in similar offices of the new Tokyo Area Chapter until general elections are held in April 1955.

At the close of the meeting, members and guests were taken on a conducted tour of Tokyo Toll, the largest switchboard facility in the world.

Fort Monmouth

An overflow gathering of some 500 members and guests attended the second fall meeting on November 4th. Following dinner at Gibbs Hall Officers Club, the group adjourned to the Myer Hall Auditorium at the Signal School to hear a talk on color television by George C. Sziklai, leading expert from the RCA David Sarnoff Research Center.

In introducing the speaker, Chapter President Paul Langguth traced his background from Budapest, Hungary, through Germany and then to the U. S. in a number of important posi-

tions before joining the Radio Corporation of America.

By using a series of slides, Mr. Sziklai projected the three primary colors of red, blue and yellow on the screen. Then by manipulating the projector the colors were run together to show how easily the blend appears to the eye. He said that much of the work in color TV was aided by the large amount of work already done in color photography, particularly in the standardization of terms.

Next, Mr. Sziklai showed slides pointing up the importance of hue, saturation and brightness in color and explained the important role that has been played by the International Commission on Illumination in setting up color standards. He then projected a series of schematics on the screen, pointing up the different systems RCA used before finally arriving at their present development of compatible color TV. He closed the program with a series of color slides that were pictures taken directly of the face of a color TV tube.

The chapter's annual meeting was held on December 2nd, with the following elected to office for the coming year:

President—Col. John C. Monahan, Deputy Commandant, The Signal School; vice-presidents — Edward F. Kolar, General Manager, Bendix Aviation Corp.; H. F. Hubbard, Signal Corps Engineering Laboratories; treasurer—Esther M. Ferneau, The Signal School; secretary—Lt. Col. Oscar C. Buser, The Signal School.

Board of Directors—Rear Adm. Andrew G. Sheppard, Lavoie Laboratories; Col. Sydney S. Davis, Signal Corps Publications Agency; Col. Thomas M. Hahn, Coles Signal Lab.; Col. Joseph E. Heinrich, AT&T Long Lines; Col. Cary J. King, Sarnoff Laboratory, RCA; Col. Paul O. Langguth, SCEL, retiring chapter president; Lt. Col. M. C. Mautz, Hqs. Signal Corps Center; Arthur L. Adamson, Electronic Associates, Inc.; Peter Hoffman, Public & Technical Information, Hqs. Fort Monmouth; Norman J. Schwartz, Heinemann Electric Co.; George Trad, Trad Television Company; Dr. Richard A. Weiss, Evans Signal Lab.

Principal speaker of the evening was Dr. O. G. Haywood, Director, Missile System Laboratory, Sylvania Electric Products, Inc. Dr. Haywood's presentation of "A Guided Missiles Systems Philosophy" will be reported in the next issue of SIGNAL.

Brig. Gen. Walter B. Larew, Chief, Army Communications Service Division, OCSigO, addresses the Chicago Chapter meeting at Fifth Army Headquarters. Also in the photo are (left) Col. Marlin S. Moody, Signal Officer, Fifth Army, who was host for the occasion, and (right) Brig. Gen. R. T. Finn, Chief of Staff, Fifth Army.

At Fort Monmouth Chapter's November meeting (l to r): Maj. Gen. Victor A. Conrad, Commanding General, Fort Monmouth; George C. Sziklai, RCA color television expert, who was the guest speaker; and Col. Paul Langguth, 1954 chapter president.

Geneva

All members of the Geneva Sub-Chapter were present at its first luncheon meeting at the Restaurant "Au Fin Bec," 55 rue de Berne, on October 28th.

Regular chapter officers were elected as follows: president—Col. John H. Gayer; vice-presidents—Col. Dane O. Sprankle and Maj. Maurice Anthony; treasurer—Cdr. Henry F. Nichol; secretary—Cdr. Gerald C. Gross, membership committee chairman — Robert Lindsey.

Plans were made for the coming year, including regular monthly meetings if possible. A number of names were suggested for new membership, and it was agreed that members should be welcomed from all parts of Switzerland. It was also agreed to invite certain distinguished leaders in the electronics and allied fields to become associate members of the chapter.

Hawaii

The Hawaiian Telephone Company was host to the Hawaii Chapter at a dinner meeting held at the Armed Forces YMCA, Honolulu, on October 27th. The company picked up the tab on the dinner bill and then conducted a tour through their plant facilities in Honolulu.

After the tour, the Chief Radio Telephone Engineer gave a very interesting illustrated lecture on the company's radio telephone operations between the various islands in the Hawaiian group. This demonstration was realistically presented in a room which contained 4-channel carrier system equipment.

Sixty members were present at the dinner and tour.

Kansas City

Guest speaker at the chapter's October 20th meeting was Dr. C. N. Kimball, president of the Midwest Research Institute, Kansas City, Mo.

Dr. Kimball discussed the status of research in general as it now exists in the United States and compared it with the research being done in other countries. He also described the operations of his organization in the research field.

The dinner-meeting was held at The Wishbone restaurant and was attended by forty-one members and guests.

Mr. J. C. Shipman, Director of Linda Hall Library, gave an informative talk on the functions of the Linda Hall Technical Library at the November 23rd dinner-meeting. He also exhibited some very old and rare technical books which included one of the original copies of Isaac Newton's works and one of the first books published of Leonardo da Vinci's Book of Divine Proportions.

Special guest of the chapter was Col. Gus B. Hoffman, Director of Communications, Central Air Defense Force. At a meeting of the officers and directors of the chapter on December 2nd, Col. Hoffman was elected vice-president to fill the vacancy created by the transfer of Col. C. E. McBrayer.

London

A diversified program was scheduled for the fall months by Romney Wheeler, chairman of the meeting committee. The September meeting (reported in Nov.-Dec. issue) was on the subject of color television; a demonstration of Decca navigator and radar equipment aboard a motor yacht on the Thames featured the October meeting; and the December meeting was devoted to the Strategic Air Command global mission in communications, with Col. V. P. McDavitt, Chief of Communications, 7th Air Division, SAC, as the speaker.

The chapter's membership roster now includes four group associate members, i.e., Automatic Telephone & Electric Co., Ltd.; Plessey Co., Ltd.; RCA Photophone, Ltd.; and Standard Telephone & Cables, Ltd.

Distinguished guests at the September meeting were: Brigadier L. H. Harris, Controller of Research, GPO, and Mrs. Harris; Admiral Sir Charles Daniel and Lady Daniel; Sir Edgar Fisk and Lady Fisk; Brig. General S. M. Thomas, Asst. Vice President, Hazeltine Electric Corp., and Mrs. Thomas; and Air Commodore Pretty, Ministry of Supply, and Mrs. Pretty.

Recently Capt. Harold E. Ruble, technical logistics officer, CINCNELM, was appointed to the office of chapter secretary to succeed Major George Marak who had returned to the States.

New York

Principal speaker at the October 20th meeting was Major General Francis L. Ankenbrandt, Commanding General

of the Airways and Air Communications Service.

General Ankenbrandt, who had recently returned from three years tour of duty as Chief Signal Officer of SHAPE, discussed various telecommunications problems and electronic accomplishments in his talk on "Some Aspects of Communications and Electronics in NATO and SHAPE."

At the conclusion of his talk, General Ankenbrandt replied to many questions addressed to him from the floor.

Attention was focused on the Bell Solar Battery at the November 17th meeting, with Dr. Calvin S. Fuller of the Bell Telephone Laboratories' research department, conducting the program.

Dr. Fuller discussed the theory and potential uses of the solar battery, a new invention of the Bell Telephone Laboratories for obtaining electric power from the sun's rays, and demonstrated its operation. He also conducted a question and answer period after his lecture.

The meeting was held at the New York Telephone Company, with a social hour and dinner preceding the program.

Annual elections were held on December 15th, with the following chosen to head the chapter for the year 1955:

President—Col. Allen E. Wharton, New Jersey Bell Telephone Co.; vice-presidents—Col. Benjamin H. Oliver, Jr., New York Telephone Co.; Rear Adm. Stanley F. Patten, Allen B. DuMont Laboratories, Inc.; Capt. Arthur F. Van Dyck, Radio Corporation of America; treasurer—Maj. Theodore N. Pope, Bell Telephone Laboratories, Inc.; secretary—Lt. Col. David Talley, Federal Telephone and Radio Corp.; recording secretary—Royal F. Jewett, Western Electric Company, Inc.

Board of directors: Vice Adm. Walter S. Anderson, Automatic Electric Co.; George W. Bailey, Institute of Radio Engineers; Col. Theodore L. Bartlett, RCA; Edwin C. Carlson, Mutual Life Insurance Co.; Lt. Col. Ludwig R. Engler, RCA Communications; Lt. Col. W. L. Hallahan, Laird & Co.; Frederick R. Lack, Western Electric Co.; Maj. Gen. Edmond H. Leavey, IT&T Corp.; Brig. Gen. A. W. Marriner, IT&T Corp.; Donald F. McClure, New York Telephone Co.; Col. Thompson H. Mitchell, RCA Communications; Raymond S. Perry, Federal Telephone & Radio Corp.; Maj. William H. Rivers, Eastman Kodak Co.; Emmett R. Shute, Serial Federal Savings & Loan Assoc.; Rear Adm. Ellery W. Stone, American Cable & Radio Corp.

Distinguished speaker of the evening was Colonel A. Howard Read, Royal Signals (Ret.), Telecommunications Attaché of the British Embassy in Washington. Colonel Read discussed telecommunication operations of the British General Post Office, a subject which was of considerable interest to the chapter members and guests present.

A highlight of the meeting was the presentation of the Geneva, Switzerland Chapter charter to Cdr. Gerald C. Gross, USNR, secretary of the chapter, who was in the States on a business trip. The charter was presented by National President George Bailey who congratulated Commander Gross on the successful organization of the latest overseas unit of the association.

Also present as a guest of the chapter was Cdr. Cornelius G. Mayer, USNR, president of the London Chapter.

London Chapter's opening meeting of the fall season featured the subject of color television. Top photo shows (standing) guest speaker Charles J. Hirsch, chief engineer of the research division, Hazeltine Corporation, and Cdr. C. G. Mayer, chapter president. In lower photo (L to R): George Ellsworth, chapter treasurer, and Brigadier L. H. Harris, GPO Controller of Research.

New York's October meeting was addressed by Maj. Gen. F. L. Ankenbrandt, Commanding General, AACS. Shown below, left to right, are: Brig. Gen. A. W. Marriner, Vice Pres., Federal Electric Co.; George W. Bailey, National AFCEA President; General Ankenbrandt; Vice Adm. W. S. Anderson, chapter president; and D. G. Galassi of the Paris Chapter.

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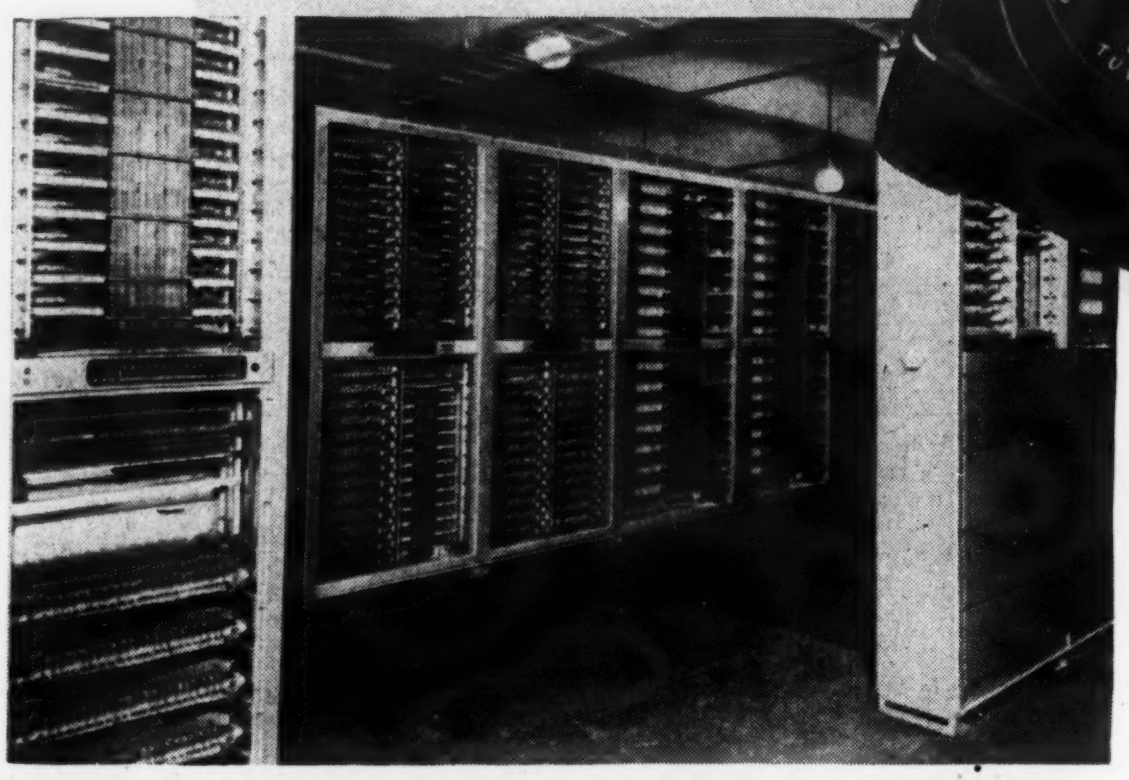
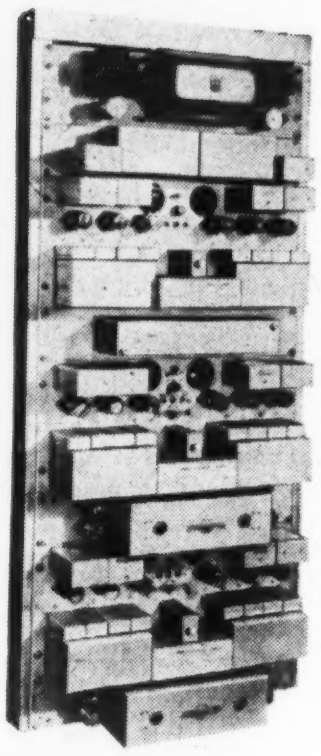


Typical of advanced design and performance in dial telephone switching systems is Kellogg Crossbar, developed by Kellogg Switchboard and Supply Company, a division of IT&T, for use in telephone exchanges. Together with Kellogg Relaymatic, as well as Step-by-Step and Rotary dial switching equipment made by Federal Telephone and Radio Company, also a division of IT&T, Kellogg provides a complete range of automatic switching systems as well as other equipment and supplies for the independent telephone industry.



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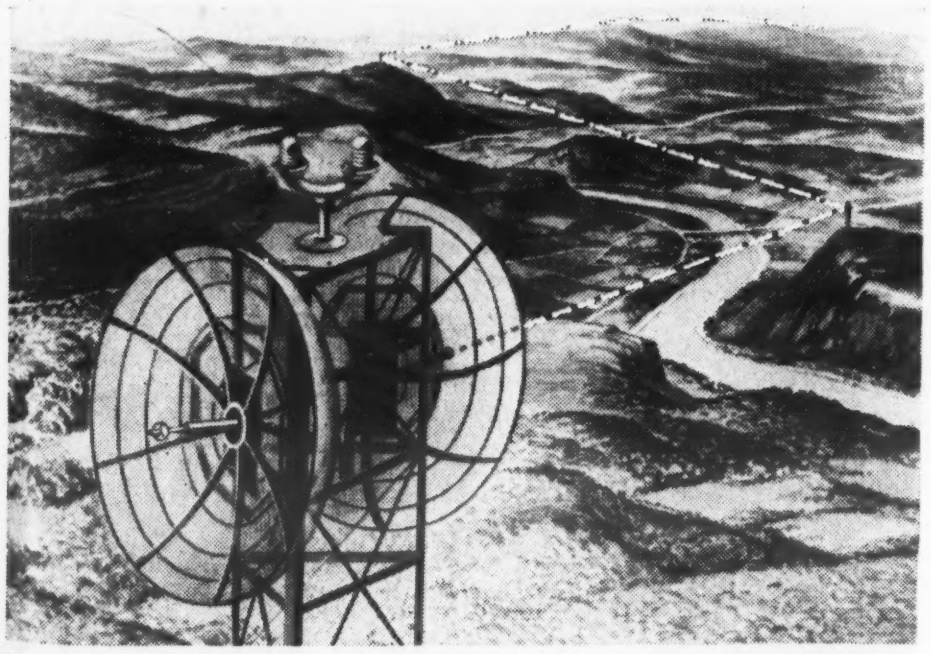

Microwave radio relay carries telephone circuits over mountains, rivers, deserts, lakes and other difficult terrain *without wire lines.* Between Bartow and Tampa, Fla., the Peninsular Telephone Co. has installed the first independent telephone company microwave link connecting with the nation-wide inter-toll dialing system. The complete equipment was designed by Federal Telecommunication Laboratories, research division of IT&T at Nutley, N. J.

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North Texas

The chapter's October 28th meeting was held at Amon Carter Field, Fort Worth.

Following dinner and a business meeting at the Sky Chef, the members and guests were taken on a tour through the American Airlines' automatic teletypewriter switching center, an AT&T installation.

Philadelphia

Over one hundred members and guests attended the initial dinner-meeting of the fall season on October 26th at the Signal Corps Supply Agency. Chapter President Russ Cramer, Radio Condenser Company, introduced new and former officers, and congratulated the host for the evening, Brig. Gen. William L. Bayer, commanding officer of the Signal Corps Supply Agency, on his recent promotion.

Flanked by an impressive display and several working models of modern Western Union equipment, Dan F. Hazen of Western Union Telegraph Company, guest speaker for the evening, discussed the tremendous progress in communications development during recent years.

Mr. Hazen evolved Western Union from its formation in 1861 through to present-day private wire systems intra-connecting as many as 232 stations. Using the working models on display, a message sent on a standard Western Union Desk-fax demonstrated its ability to transmit 100 lines per inch per minute.

A color sound film illustrated Western Union's Intra-fax system with Desk-fax stations which enable Pullman reservation requests and tickets to be relayed using color drums for coupons and tickets.

The speaker also discussed developments in process and looked into future planning by Western Union including a fully automatic switching system for the USAF, an automatic Desk-fax concentrator, and weather forecast transmittals.

Chapter committees for the year's activities are: civilian defense: Philadelphia—W. J. Cannon, Camden—T. A. Smith; membership: Edward Barth, Richard Wickes, R. Halberstadt and F. O. Ziegler; program: William Powell, George Cohen, Al Smith and William Matteson; publicity: Norma Testardi.

The chapter inaugurated the holiday season with a highly successful buffet dinner and dance on December 8th. The affair was held at the Quartermaster Depot Officers Club, with a cocktail hour preceding the evening's festivities.

Col. George Dixon, Executive Vice President, came up from Washington for the occasion, as did George Ruehl of Baltimore, AFCEA Regional Vice President. Col. Dixon presented the chapter with a check returning to its treasury the revolving convention fund which it had originated following the 1952 convention in Philadelphia. Since Dayton-Wright, host for the 1953 meeting, and Washington, host for 1954, had not found it necessary to draw on this fund, it was being returned to the Philadelphia Chapter with expressions of appreciation for its generosity.

Pittsburgh

A tour of the plant of the Pittsburgh *Post Gazette* featured the October 28th meeting of the chapter.

The members and guests were divided into small groups and conducted on a tour of the entire facilities, with guides explaining each of the steps in the process of getting out Pittsburgh's only morning daily paper.

The confusion of the City Room left the members amazed that anything like the order of a newspaper could come out of it. From there they visited the wire services communications center, stereotype plant, engraving rooms, mail room, and finally were able to view at close range the massive presses running off an early edition of the next day's paper. How the presses were set up and how the sheets were collated, folded, assembled, counted and wrapped, all automatically, was demonstrated in minute detail.

There were many enthusiastic comments about the tour and, particularly, about the courteous and efficient manner in which it had been conducted.

The annual Christmas party, replete with festive decorations, excellent food and refreshments, and a good orchestra, was, as always, an outstanding success. The party was held at Danceland in West View Park on December 10th and, despite inclement weather, 148 members and guests were in attendance.

The grand prize, an RCA Brentwood 24" television set, was won by Fred A. Hornsby. The winner of the consolation prize, an RCA 45 RPM record player, was Harry S. Brown.

The hard-working commitee responsible for the excellent arrangements was chairmanned by Kenneth E. Doriot.

San Francisco

The Pacific Telephone and Telegraph Company was host to the chapter on September 30th with a tour of its newest central office in San Francisco, the Mission Central building.

Mr. C. L. Wickstrom, defense activities engineer for PT&T and chapter vice-president, who had arranged the evening's program, extended the company's welcome to the chapter at dinner in the central office building cafeteria and gave a brief preview of the activities housed in the Mission building. The Mission Central Office, he explained is one of nine central offices in San Francisco and environs, excluding toll offices. The Mission exchange, housed in a newly-constructed eight-story building, is the most recently installed of these nine exchanges, and is equipped with the latest Bell System dial central office equipment, including cross-bar switching equipment.

In addition to the central office, Mr. Wickstrom pointed out, the building houses two regional PT&T operations, the complete telephone directory service for Northern California, and the automatic message accounting office for the fifty cities and towns in the Bay Area. Eight hundred people are employed, he said, to staff the activities in the building.

Following this briefing, the chapter was guided through the building by the department staffs to see the various departments in operation. Two complete floors of the building are filled with automatic cross-bar dial equipment, distribution frames, and equipment to test the 40,000 local lines served by this central office. These local lines are individually tested au-

Philadelphia Chapter officers and some of their guests at the holiday dinner-dance on December 8th (l to r): William F. Powell, program chairman; Norma Testardi, publicity chairman; J. P. Barkow, vice president; Mrs. Barkow; Col. George P. Dixon, AFCEA Executive Vice President; Tom Armstrong, secretary; Mrs. Cramer; Russell E. Cramer, Jr., president; Mrs. Anderson; Capt. C. H. Anderson, vice president; Col. D. L. Rundquist, vice president and Mrs. Rundquist.

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tomatically through each separate part of the automatic dial equipment, with trouble and its location in equipment or line flashed immediately to test personnel. Trunk lines between Mission and other centrals are also watched automatically, with trouble being signalled for attended testing.

In addition to this automatic local dial equipment, the Mission central office has 95 positions of long-distance switchboard through which long-distance operators reach telephones nationwide by operator-keying to distant central offices.

The automatic message accounting office performs the small miracle of translating perforated tape records of customers' calls, which are recorded automatically at the central office of origin and sent in to the automatic message accounting office, into the customer's monthly telephone bill. The essence of this procedure is to decode answering and disconnect times for individual telephone numbers, translate these into length of time and distance of call, apply a rate, compute charges, and total all charges for each customer for the month. This is done automatically, with positive double-check, on electrical-mechanical equipment designed by Bell System engineers.

Sometimes overlooked because of its location in the basement and because it functions so reliably without fuss or feathers, is the central's power plant. Chapter members were impressed with the foresight of arrangements for emergency power, both for telephone equipment and for essential building functions, such as lighting and elevators.

The chapter reports that the smoothness of the tour and the interesting points brought out at each station are worthy of mention in appreciation of their host's hospitality and in tribute to the organizational efficiency of the Mission Central Office building.

The Signal Section of Sixth Army Headquarters was host for the November 18th meeting, with dinner at the Officers Club, Fort Scott—overlooking San Francisco's famous Golden Gate—followed by a tour of Signal installations at the Presidio of San Francisco.

A short business session was conducted in preparation for the election of chapter officers in January. The membership unanimously adopted a motion expressing appreciation for Col. Parsons' inspiring leadership as president of the chapter for the past three years.

After the meeting, the chapter was taken on a tour of Signal communications and photographic installations at Headquarters, Sixth Army, by the host of the evening, Col. Ariel B. Cooper, Sixth Army Signal Officer, assisted by Col. William L. James, Lt. Col. Charles J. Schauers, and other members of his staff and operating personnel.

Groups toured the point-to-point radio facilities, the carrier multiplexing equipment on land lines and radio circuits, the automatic tape relay center, the telecon rooms, and other communications facilities that carry the traffic for this major terminal in the Army command and administrative network. Sixth Army communications facilities, Col. Cooper pointed out, are the focal point for traffic between the continental United States and the Pacific-Far East area.

The chapter also saw the Sixth Army photographic installation, including film library and maintenance department, and viewed a recent Signal Corps film on Formosa. Of special interest to a number of members was the MARS station at the Presidio, which is now equipped with radio teletype for operation on amateur frequencies with Far East counterparts.

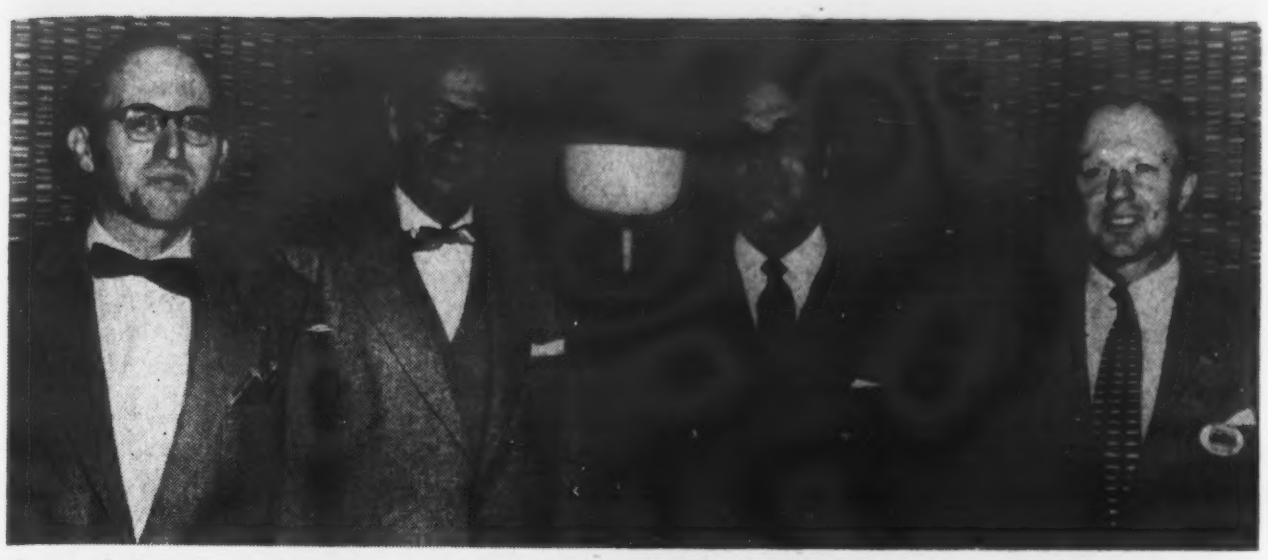
San Juan

Since its inauguration, the chapter has been holding regular dinner-meetings the last Thursday of each month. Guest of honor at a recent meeting was the Congressman from Puerto Rico, the Honorable Antonio Fernós Isern.

The chapter has embarked on a very worthwhile undertaking which has to do with the construction of radio equipment to help the blind in their efforts to improve themselves. Among the local projects for the blind is one to teach them to present plays and other theatrical performances. However, they require a prompter. It has occurred to one of the teachers of the blind that, if a low power radio transmitter could be installed on the stage and each performer was equipped with a small radio receiver tuned to the frequency of the local transmitter, the blind could be taught much faster to undertake such presentations.

The San Juan Chapter is anxious to commence work on this project, and would appreciate hearing from any AFCEA members who may have a practical and economical answer to this problem. Letters should be addressed to the chapter president, Jose D. Dominguez, Porto Rico Telephone Co., P.O. Box 4275, San Juan 21, P. R.

A tour of the Mission Central Bldg. of the Pacific Tel & Tel was the feature of San Francisco's September meeting. Shown at right is a group of members listening to a description of automatic test equipment. Photo below shows head table at November meeting at Fort Scott; l to r: C. L. Wickstrom, chapter vice president; Col. Airel B. Cooper, SigO, Sixth Army; Col. Lloyd C. Parsons, chapter president; Col. Wm. L. James, Exec. Officer, SigSec, Sixth Army; Capt. Hedley Morris, USN; M. M. Bell, Pacific T&T; and Lt. Col. Charles J. Schauers, Chief, Op. Br., Plans & Operations Div., Sixth Army SigO.



Shown (above) at Scott-St. Louis Chapter's October meeting, l to r: David Richardson, secretary-treasurer of Decatur Chapter; Col. George Dixon; Col. Gomer Lewis, chapter president; and Allan Eisenmayer, chapter secretary.

James Christensen, Supt. of Illinois State Bureau of Criminal Identification and Investigation, was guest speaker at the Scott-St. Louis November meeting. Above, l to r: Paul Haas, St. Clair County Sheriff's office; Mr. Christensen, and Louis Dechant, chapter member, connected with police radio work in industry.

Scott-St. Louis

Col. George Dixon, Executive Vice President, visited the chapter for its October 15th meeting and was guest speaker of the evening. He gave the membership a comprehensive picture of national association affairs and reported on the activity of other chapters throughout the country and overseas.

Also featured on the program was the NBC kinescope of the tactical television demonstration held at Fort Meade in August, which was made available for the meeting by the Chief Signal Officer.

The dinner-meeting was held at the Elks Club in Belleville, the usual meeting place of the chapter.

The November 18th meeting was addressed by James Christensen, Superintendent of the Illinois State Bureau of Criminal Identification and Investigation. He told of some of the ingenious and scientific methods used in identification and detection of criminals, and supplemented his talk with color slides.

The chapter's anniversary dinner, always a gala affair, was held on December 3rd and marked the successful conclusion of the third year of activity. National President George W. Bailey was on hand to help celebrate the occasion. In his message to the chapter, he emphasized that the mission of the Association is the individual concern of each member. He reviewed national AFCEA affairs and told of the fine enthusiasm and interest he had encountered on visits to chapters throughout the country.

Principal speaker was Clifford G. Wassall, Defense Activities Engineer of Southwestern Bell Telephone Company, whose subject was "Our Defense against an A or H Bomb." Mr. Wassall, who works directly with industry and the military on matters related to continental defense, gave an authoritative talk, within security limitations, on this country's preparedness against attack.

Seattle

A talk on telemetering flight test data from large aircraft was the feature of the September 15th program, with Mr. Staples of Boeing Aircraft Company as the speaker.

In lieu of an October meeting, chapter members made a trip to the radio transmitter station of the Alaska Communication System in West Seattle.

A lecture-demonstration on "The Story of the Transistor" was presented at the November 10th meeting by Charles N. Key of the Pacific Telephone and Telegraph Company. Mr. Key described the development of the space-saving, high-efficiency electronic component and made predictions as to its military and commercial applications in the future.

Chapter President Warren Taylor appointed a nominating committee to report at the December meeting as follows: Theodore W. Copeland, chairman, Alfonzo A. Baird and Merrill Peoples.

The dinner-meeting was held at the Seattle Elks Club. As customary, the members and guests were called upon to introduce themselves and state their business affiliation.

South Texas

Dr. George Herrman, Civilian Chief of Industrial Medicine, Kelly Air Force Base, presented an interesting and challenging talk at the October 12th meeting on the part that electronics could play in the medical field today. Formerly Chief of the Instrumentation Section, Surgical Research Unit, Brooke Army Medical Center, Dr. Herrman, who is a doctor of medicine and also an electronics engineer, was well qualified to speak on this subject.

The doctor stressed particularly the need for design and development and production of electronic instruments that could be used by medical profession for clinical work and for diagnosing the ills of mankind as a whole. He drew parallels of the progress of instrumentation in the medical field and listed innumerable vital and urgent needs that as yet were not being satisfactorily met.

Jeff Coffey, District Traffic Superintendent of the Southwestern Bell Telephone Company, was guest speaker on November 2nd at the Fourth Army Officers Club. He was introduced by Chapter Vice President Howard Davenport of Southwestern Bell, who had arranged the program.

Distinguished guests of the chapter were presented to the membership by Col. George Richon, Chapter President, as follows: Maj. Gen. P. G. Clarkson, recent atomic test Joint Task Force Commander; Maj. Gen. Harold H. Bassett, a chapter member who had recently received his second star; Col. Earl Chase, Deputy Post Commander, Fort Sam Houston; and Col. Harold Hughes, chapter member and new commanding officer of the AACS Wing at Randolph Field.

Mr. Coffey outlined the present plans, current progress and future aims of the international toll dial telephone system being installed by the Bell System. He explained that the phone number changes recently completed in San Antonio were part of the national numbering system required to allow eventual toll dialing service anywhere in the U. S. and Canada. He also explained the national coding system, showing how each telephone in the

country would have a number that applied to that phone only.

After outlining the system, Mr. Coffey, by use of special aids, demonstrated its actual operation from subscriber to subscriber. He indicated that, at present, in most localities where installations had been made, only subscriber to operator to subscriber was possible, but that eventually, as more complete installations, could be made, direct dialing and automatic billing of all toll calls except person-to-person could be accomplished.

A question and answer session followed, after which Mr. Coffey demonstrated application of the currently developed photo transistor as a control element, and the regular transistor as an audio oscillator and competitor of the vacuum tube. The equipment used during the program was available for inspection by chapter members at the conclusion of the meeting.

The chapter met again on November 17th for a guided tour of the various laboratories and projects at the Southwest Research Institute.

Staff members of the Institute acted as personal guides for the various groups making the tour. Some high points were the demonstrations of the Vibratron as a pressure sensitive device and indicator, the use of nuclear resonance to determine water content of solids, and the use of an analog computer to study vibration problems in pipe lines. The tour lasted more than an hour, with members being invited to return at a later date to spend more time in any specific place if they desired.

At the close of the tour, a barbecue lunch was served on the lawn by the main administration building of the Institute.

The program was arranged by Steve Simpson of Southwest Research Institute, who, as chairman of the chapter's program committee, is responsible for the very fine meetings being staged by the South Texas Chapter.

Southern California

Major General Gordon A. Blake, Director of Communications, USAF, was the featured speaker at the chapter's November 17th dinner-meeting, and emphasized the importance of standardizing industry's program on reliability of electronic equipment. He also discussed applications of photography and optics.

In his capacity as first vice president of the association, General Blake reported on national affairs and particularly on the October 29th meeting of the national board of directors at which the name of the association was officially changed to indicate electronics as a primary interest. (*See AFCEA President Bailey's letter on page* 32.)

Southern Connecticut

Col. Edgar L. Love of Whitney Blake Company was re-elected president of the chapter at the December 2nd business meeting which preceded a Christmas party.

Other officers chosen were: vice-presidents—Lincoln Thompson, Raymond Engineering Laboratories; H. J. Hoffman, Machlett Laboratories; Charles Ecklund, Dictaphone Corporation; secretary—R. E. Nelson, Machlett Laboratories; treasurer—Edwin P. Hurley, Southern New England Tel. Co. Directors — T. H. Beard, Dictaphone Corp.; J. B. Cook, Whitney Blake Co.; B. Hordeski, Berkshire Transformer; J. J. McKeon, Sound-Scriber Corp.; Spencer Montgomery, Sr., The Montgomery Co.; I. T. Shapiro, Signal Corps Supply Agency; William Talley, Talco Engineering Co.; and W. W. Wrenn, Southern New England Telephone Co.

Committees were appointed as follows: membership—I. T. Shapiro, and Joseph Tusso, Avnet Electric Supply Co.; publicity — Edward Horelick, Whitney Blake Co., and Kurt Steinity, Berkshire Transformer Co.; program—Spencer Montgomery, Jr., The Montgomery Co., and Bernard Rosenberg, Signal Corps Supply Agency; civil defense—Edwin P. Hurley, and Sidney Rosenberg, Signal Corps Supply Agency.

The highlight of the Christmas party was an outstanding demonstration of legerdemain by John B. Cook, president of Whitney Blake Company. Mr. Cook demonstrated his unusual skill as an amateur magician of national repute, baffling the enthusiastic audience with coin and card tricks. His performance was a fitting climax to a successful meeting and an equally successful first year of activity for the Southern Connecticut Chapter.

Southern Virginia

The chapter's Executive Committee met on November 17th to formulate plans for a general dinner-meeting on December 10th and to appoint committee chairmen as follows:

Membership—Col. H. G. Hayes (Ft. Monroe), chairman; Maj. L. A. Spindelman (Langley AFB); Capt. R. R. Hay (Navy and Norfolk area); Francis X. Maida, president of Maida Development Co., (civilian members).

Program and Financial—Col. J. A. Plihal (Langley AFB), chairman; Col. W. M. Lauterbach (Navy and Norfolk area); Lt. Col. M. H. Lawson (Ft. Monroe); Maj. R. E. Anderson (Ft. Eustis); and F. X. Maida.

Publicity, Reserve, Liaison and Student—Lt. Col. W. M. White (Langley AFB), chairman; Capt. R. R. Hay; and Col. J. A. Sawyer (Ft. Monroe).

Sixty-two members and guests attended the December 10th dinner-meeting at the historic Casemate Officers Club of Fort Monroe. Lt. Col. Melvin H. Lawson of the Signal Section, OCAFF, acted as host in the absence of Col. H. G. Hayes, Signal Officer and chapter vice-president. After welcoming the chapter, Col. Lawson gave a talk on the history of Fort Monroe and extended an invitation to all members to visit the Fort at their leisure.

Maj. Gen. Gordon A. Blake, Director of Communications, USAF, was guest speaker at Southern California Chapter's November meeting. Shown with General Blake, above, are Chapter President Richard Fuller (left) and Rr. Adm. Charles F. Horne, chapter director.

The meeting was presided over by Col. Robert F. Frost, chapter president. During the business session, the chapter voted to change its name from the Peninsula Chapter to the Southern Virginia Chapter and to take in the territory south of Richmond to N. Carolina.

Tinker-Oklahoma City

Three films on new type Air Force electronics equipment were shown in Theater No. 1, Tinker Air Force Base, where the chapter met for its October 29th meeting.

During the business session plans were made for future programs. Frank Rohrer of Western Union, chapter vice president, stressed the need for activity which will increase attendance

and also attract new members into joining the chapter.

A civil defense program featured the November 18th meeting at Beverly's Restaurant in Oklahoma City, with five authoritative speakers giving the chapter the benefit of their knowledge and experience.

The program was presented by Del Cravens of Southwestern Bell Telephone Co., chairman of the chapter civil defense committee, who introduced the following guests: Lew Chatham, State Director of Civil Defense; Fred Fox, Civil Defense Coordinator, Oklahoma County; Mrs. Phyllis Neal, assistant to Mr. Fox; Mr. Heckman, radio engineer, County Sheriff's Office; Lt. Robert Burnett, Communications Composite Squadron, Civil Air Patrol, Oklahoma City; Maurice Williams, Civil Defense, Southwestern Bell Telephone Co.; Grant Landen, Civil Defense Coordinator, Oklahoma City.

Col. Lewis G. Young, Director of Communications-Electronics, 33rd Air Division, and a member of the chapter's board of directors, introduced Col. Winton Matthews, Ground Observer Corps Coordinator for 33rd Air Division, and Preston Pender, FCC Coordinator for the six-state area of defense assigned to the 33rd Air Division.

The talks covered various aspects of the civil defense program. Col. Young outlined the Conelrad setup pertaining to the six-state area of the 33rd Air Division. He was assisted by Del Cravens who discussed the Bell System's sequential long distance telephone service to alert key defense cities within the six-state area.

Col. Matthews defined the mission of the Ground Observer Corps and explained why a drive would be underway shortly for more volunteers for the Corps. Mr. Pender described the origin of civil defense, down to the present, and emphasized the need for active community programs and evacuation of cities.

Feature speaker on the program was Lew Chatham, State Director of Civil Defense. This was Mr. Chatham's second appearance before the chapter. He discussed the progress made to date in his efforts to organize the entire state into active civil defense organizations, and outlined the state's responsibilities which essentially begin where the 33rd Air Division ends. He emphasized the fact that the big obstacle facing civil defense was lack of funds and failure of the civilian population to recognize the need for a civil defense program.

Last speaker of the evening was Fred Fox who discussed the county responsibilities in the civil defense setup, and pointed out the difficulty encountered in obtaining funds and cooperation from Oklahoma County residents.

Washington

Vice Admiral Robert P. Briscoe, Deputy Chief of Naval Operations, addressed the November 3rd luncheon meeting on the subject of "Electronics in Fleet Readiness." The Navy's progress in the field of electronics "has been so fast that problems have not always been solved as they came up," he told the Washington members and guests. "Some have simply climbed aboard and come along, growing daily."

Discussing factors which tend toward unreliability, the Admiral said, "First and foremost probably is the complexity of equipment created by the ever-increasing demands of operational requirements . . . an area with which we can cope successfully and we are making progress. In addition, poor designs, inadequate manufacturing techniques and quality controls, as well as careless maintenance practices create unreliability in the field. These problems, with the help of industry, are being attacked from all directions. In the main, they add up to simplification of equipment and systems, standardization, ruggedness, intelligent testing and evaluation programs and development of reliable tubes and components." A vivid example of the importance of reliability was given as follows: "the lack of replacement for a single faulty tube can silence a 270-ton transmitter—thus nullifying 24 freight car loads of basic transmitter equipment and 12 car loads of antenna ground system equipment."

Admiral Briscoe stated that general equipment specifications are being revised to reflect the latest thinking in reliability, simplicity and ease of maintenance, and that these specifications call for the use of new, higher quality, reliable tubes. He also said that, in connection with parts selection and application data, the Bureau of Ships is establishing preferred parts lists which will include newly-developed and tested component parts presently in use. These lists will mark a step toward reliability because parts whose capabilities are known will be used. In addition, it will establish a measure of standardization, he pointed out.

Distinguished guests at the head table were introduced by John F. Gilbarte of Admiral Corporation, the program chairman of the meeting, as follows: Capt. C. K. Bergin, Asst. Chief of Research, Navy Bureau of Ordnance; Leo C. Young, civilian consultant, Naval Research Laboratory radio division; Rear Admiral Stanford C. Hooper; Rear Admiral Frederick R. Furth, Chief of Naval Research; Vice Adm. M. L. Royar, Chief, Office of Naval Material; Rear Adm. W. D. Leggett, Jr., Chief, Bureau of Ships; Dr. Robert M. Page, Associate Director of Research for Electronics, NRL; Capt. J. B. Bowen, Jr., Chief, Electronics Division, Bureau of Aeronautics; Charles DeVore, assistant technical information officer, NRL; Lt. Cdr. F. O. McDonald, Bureau of Naval Personnel, Naval Reserve Training Section.

On display during the meeting was the Hooper Trophy for excellence in electronics training which had recently been awarded in the first nationwide competition between Naval Reserve electronics divisions. Admiral Hooper, for whom the trophy was named, was given a standing ovation by the 250 members and guests present.

Southern Virginia Chapter officers (l to r): Gerald R. Sauer, ass't secretary; Leo F. Zakowski, secretary; Col. Joseph A. Plihal, vice president; Maj. Roy E. Anderson, vice president; Col. Robert F. Frost, president; Col. Harold G. Hayes, vice president; Lt. Col. Stancill M. Nanney, treasurer.

General Charles L. Bolte, Vice Chief of Staff, United States Army, and Dr. E. Maurice Deloraine, General Technical Director, International Telephone and Telegraph Corporation, were guest speakers at the December 1st luncheon at the National Press Club. Major General Francis H. Lanahan was program chairman of the meeting.

Discussing the role of communications and electronics in the Army, General Bolte pointed out that the Army of the future will be distinguished by ever greater mobility and firepower in its tactical applications, and by increasing complexity in its weapons and equipment. This complexity, he said, is attributed in large measure to the rapid advances of the electronics industry, and the military uses which are afforded thereby, and to the influence of nuclear weapons.

"Advances in the field of communications provide the means whereby the Army's firepower and mobility can be coordinated and controlled," General Bolte said. "Communication is thus an essential tool of the commander, without which control of his forces on the battlefield cannot be exercised. A battlefield commander without effective communications is in an untenable position, for his ability to influence the course of action is directly related to his ability to receive and transmit information and orders."

"Electronics," he declared, "are becoming, in large measure, the eyes, ears, nervous system and, to a more limited extent, part of the brain which controls the disposition and employment of military forces and weapons," and pointed out that this, in turn, requires a greater investment in training to procure the skilled soldier this equipment demands.

He also called attention to the fact that, with the establishment of the Electronic Proving Ground at Fort Huachuca, the Army for the first time has the facilities to lay out in full scale the communication and electronic operations of an entire field army for study and evaluation.

Vice Admiral Robert P. Briscoe, Deputy Chief of Naval Operations, who addressed November meeting of Washington Chapter.

Dr. Deloraine reviewed the development of communications and electronics in Western Europe during the past ten years, with particular emphasis on the progress made since 1950.

He stated that there is a large reservoir of technical talent in Western Europe today but that its efficiency should be increased to attain more uniformity and standardization. As examples, he mentioned that in Western Europe there are four standards of television instead of one, and that in the field of telephone switching there are about fifteen systems as compared to six in the United States. The end result, Dr. Deloraine said, is that there is a higher ratio of research, development and engineering to production in Western Europe than would be the case if a higher degree of standardization existed.

Dr. Deloraine felt that an enormous amount of progress had been made during the past four years, and cited the coaxial cable system which is the basic network for the Infrastructure network as being remarkably uniform and representing a real effort in coordination. He also expressed the belief that Western European contributions in communications and electronics would add substantially to the strength of the NATO nations.

Student Chapters

Northeastern University

Chapter activities for the fall term consisted of weekly meetings in a variety of subjects. Some of the highlights were: a trip to Station WBZ-TV; a speaker from the New England Telephone & Telegraph Company; a trip around Boston Harbor on board an Army tug; Colonel M. D. Harris, PMS&T, addressed one meeting; the Assistant Fire Commissioner of Boston was guest speaker at another; a local officer showed slides taken on his tour of duty in Europe; another program featured a speaker on the subject of research and development costs, etc. Other meetings featured various films on communications and electronics and related subjects.

The chapter also set up several displays at the University, one of which was sponsored by Sylvania Electric Products, Inc.

New officers were elected for Division A for the year ending November 1955 as follows: president—James C. Manning; vice president — Robert Beatty; treasurer—Stanley Swartz; secretary—Will Nelson; asst. secretary—John Olson; publicity chairman — Robert Stewart; program chairman — Melvin Wartel. Other committee chairmen were appointed as follows: scholarship—R. Beatty; photo section—Jack Carp; communications and electronics—Louis Maggi; committee coordinator—Ralph Limmer; class coordinators—Frederic T. Hersey '56; others to be appointed later.

Washington Chapter's December meeting. Those at the head table are (l to r): Adm. J. J. Clark, Vice Pres., Radio Receptor Co.; President Wm. H. Harrison of IT&T; Br. Gen. Marcel Penette, French Military Attache; Maj. Gen. H. C. Ingles, retired pres., RCAC; Maj. Gen. F. H. Lanahan, program chairman; Dr. Maurice Deloraine, IT&T; Col. Frank Wozencraft, president; Gen. Charles L. Bolte, Vice Chief of Staff, USA; Lt. Gen. Jean E. Valluy, French member of the Standing Group, NATO; Lt. Gen. G. H. Decker, Comptroller of the Army; Br. Gen. Vincent Saubestre, French Air Attache; Maj. Gen. F. L. Ankenbrandt, Commanding General, AACS; and Edward J. Girard, IT&T. Also at head table but not shown in photo was Col. Pierre F. Gobert, French liaison officer with Fort Monmouth.

ITEMS OF INTEREST

From Government, Industry and the Services

Automatic Production System Successfully Used by Navy

The Navy has announced the successful completion of the first contract involving use of the radically new modular or "building block" automatic production system in the manufacture of several thousand highly complicated electronic subassemblies for sonobuoys.

The new production system was developed by the National Bureau of Standards for the Navy Bureau of Aeronautics as an industrial preparedness measure under the former code name "project tinkertoy." (*See* SIGNAL, *November-December 1953*)

An experimental automatic pilot factory, operated in Arlington, Virginia, by the Willys Motors Corporation under contract to the Bureau of Aeronautics, has presented an opportunity for evaluating the technical and economic aspects of a mechanized production line for electronic products.

Preliminary tests of the mechanically assembled equipment indicate higher performance and reliability than similar equipment built by conventional methods. The Bureau of Aeronautics recently announced that mechanized production has sufficiently advanced to warrant its more extensive use in producing field equipment for the fleet.

NEW RCA LAB IN BOSTON AREA

An engineering laboratory for the development of specialized electronic fire-control systems for military aircraft will be established by the Radio Corporation of America in the greater Boston area early this year.

Dr. Robert C. Seamans, Jr., nationally known authority on airborne electronics, has been appointed manager of the new laboratory. Location of the new facility is still to be determined, but it is expected to be equipped and in operation by early February.

Location of the new RCA development activity in the Boston area reflects the growing importance of New England as a center of the engineering and development of electronic systems for a wide range of military and industrial applications.

Broadband Recorder Developed At Coles Signal Lab

A unique sound and signal recorder employing a 10" wide magnetic tape is entering its final stages of development at Coles Signal Laboratory, Fort Monmouth, New Jersey.

The utilization of a fast moving continuous tape in conjunction with a high speed rotating disc mechanism, has made it possible for this broadband recorder to directly record signals and sounds far beyond the range normally attainable in commercially available recorders.

The Broadband Recorder will pick up and record electronic signals up to 5 megacycles per second. This equipment reaches into frequency domains 250 times beyond the hearing range of the average person, and represents the first time that 5 megacycle signals have been directly recorded.

Until recent years there has been little need for making records of such high frequency signals. At present, however, many of our complex weapons, computer devices, radar, aircraft and atomic devices involve high speed phenomena and demand specialized test equipment to check and recheck performance. The broadband recorder is designed specifically for this purpose and work is continuing at the Fort Monmouth Laboratories to increase the usefulness of this new device.

Argus Honored As "Growth Company of the Year"

Argus Cameras, Inc., of Ann Arbor, Michigan, has been honored as "growth Company of the year" by the National Association of Investment Clubs.

Chester Drake of Detroit, president of the NAIC's Michigan Division, presented a plaque to Robert E. Lewis, Argus president, and read the inscription: ". . . A dramatic example of American free enterprise . . . dynamic sales and earnings growth . . . excellence of products and public relations."

Mr. Lewis, president of the firm since 1950, replied: "To be recognized as 'growth' company of the year by such an outstanding organization as NAIC, which is by principle continually analyzing American companies from a growth standpoint, is indeed a unique honor . . . I believe that your organization, by the interest it has stimulated in American business, is performing a real service for our country."

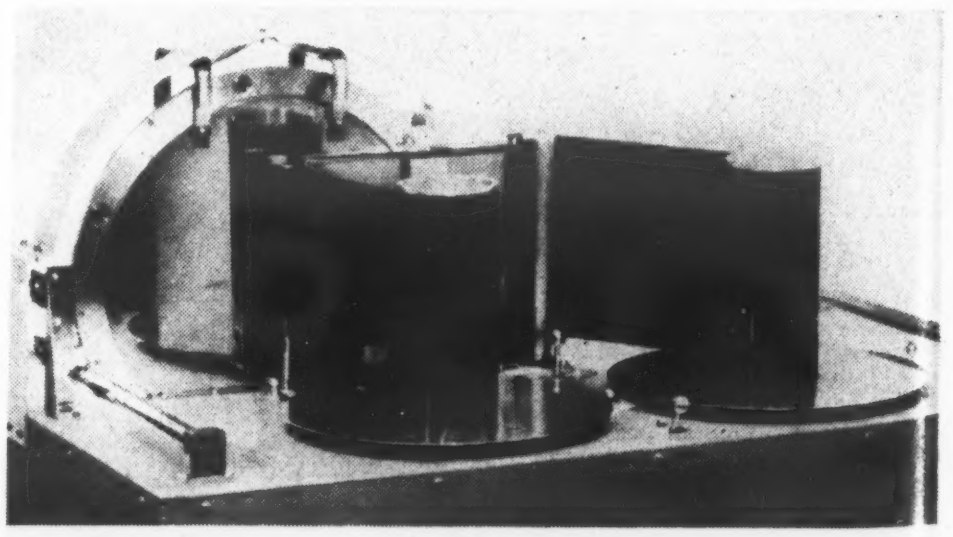
Net sales of Argus, manufacturer of cameras and precision optical instruments, rose from $5,333,788 in fiscal 1950 to $22,409,132 in fiscal 1954.

CIVIL DEFENSE COMMUNICATIONS NETWORK IN LOS ANGELES

With the addition of three new trailer-mounted mobile communications centers, Los Angeles has become the first city in the nation to provide a flexible, integrated communications network for its civil defense organization.

These new units, each representing an investment of approximately $40,000, tie into 36 fixed communications centers throughout the city which in turn reach a total of 90 message centers. To man this entire system would require a total of 17,800 persons for a single shift.

This new equipment represents the combined planning of city personnel,



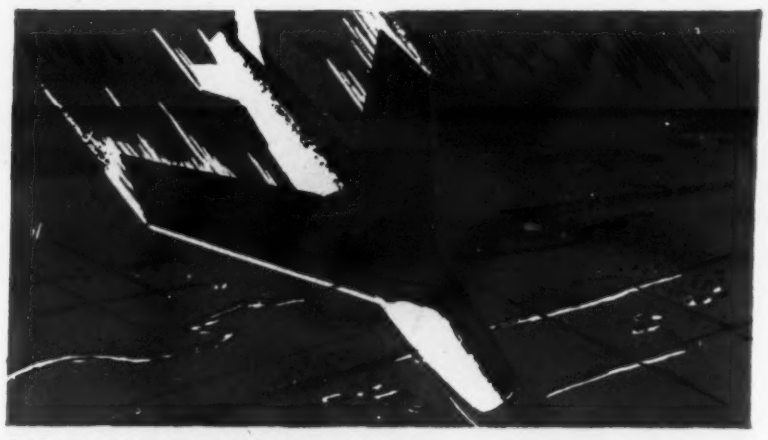
Shown at right is the broadband recorder in its desklike housing, with a 10-inch tape running from one reel to the other. The magnetic tape has a forward speed of nearly 50 inches per second.

SPERRY DEVELOPS MEGAWATT KLYSTRONS

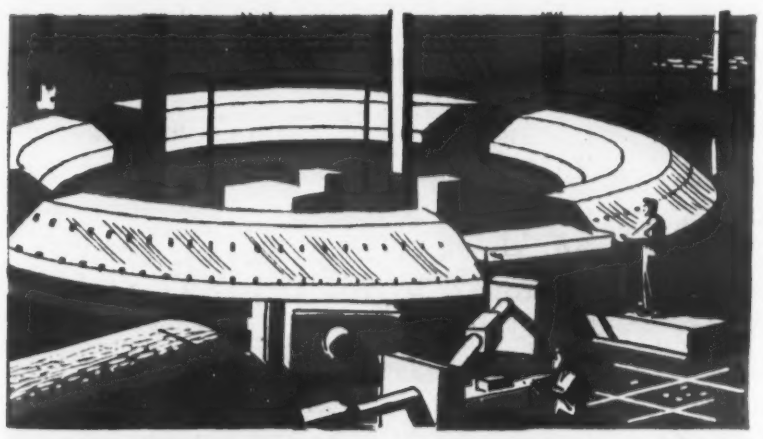
Super-Power Tubes Open Way to Electronic Advances

The giant tube you see illustrated here is the first Megawatt Klystron ever built for military use. It is also the first of a series of Sperry Klystrons producing millions of watts of precisely controlled radar power. Developed by Sperry and the Air Research and Development Command primarily for defense purposes, its capabilites indicate that potential uses are virtually unlimited.

IN RADAR DEFENSE . . . Sperry's new Megawatt Klystrons have provided more than 250 times the radar power that beamed impulses to the moon and back in 1946. Such power—with a frequency held 20 to 200 times closer than the frequency limits of conventional radar or TV transmitters—permits obtaining greatly improved information from search radars.



IN GUIDED MISSILES . . . Sperry's new Megawatt Klystrons make possible more accurate control of missiles permitting guidance over longer paths.



IN ATOMIC ENERGY... Sperry's new Megawatt Klystrons provide stable driving power for larger atom smashers and high energy X-ray devices used for scientific research.

Eight feet tall, the first Megawatt Klystron Amplifier developed for military purposes by Sperry, develops 4,000,000 watts of power with up to 43% efficiency and 38 db. gain. Other Megawatt Klystrons are now in production.

FOR FURTHER INFORMATION Qualified organizations can receive information on these super-power tubes to aid in electronic system design by writing to our special Electronics Department.

SPERRY GYROSCOPE COMPANY

DIVISION OF THE SPERRY CORPORATION, GREAT NECK, NEW YORK

CLEVELAND • NEW ORLEANS • BROOKLYN • LOS ANGELES • SEATTLE • SAN FRANCISCO
IN CANADA—SPERRY GYROSCOPE COMPANY OF CANADA LTD., MONTREAL, QUEBEC

the Fruehauf Trailer Company and the General Electric communications department.

In addition to the three trailer units there is a similarly-equipped fixed base, but any of these three mobile units can function as a base if the permanent station, which is located in a heavy concrete structure is knocked out.

The General Electric equipment is the latest in electronic communications, the units having a wide potential radio range. There are six panels and each operates radio reception and transmission on independent channels. In addition, a master control ties in with other communications units including the Amateur Radio Relay League.

The system includes 150 mobile two-way radio units, 100 portable walkie-talkie units, 60 medium powered radio transmittting and receiving stations in fixed locations throughout the city. Power for the mobile trailer units is provided by a 25 kilowatt Onan motor-generator set mounted on a four-wheel "pup" trailer.

Electronic Supply System Conference at Great Lakes

Approximately 200 military and civilian representatives of 55 Armed Forces activities gathered at the recent Navy-wide Electronic Supply System Conference at Great Lakes, Illinois.

The conferees participated in panel discussions on electronic supply problems and heard addresses by leaders in military and industrial electronics, as well as Naval logistics.

Among the speakers were Rear Admiral William B. Ammon, USN, Director of Naval Communications, and W. Walter Watts, Executive Vice President, Electronic Products, Radio Corporation of America. Both men are national directors of the AFCEA. (For the text of Mr. Watt's speech, see page 13.)

Commander Russell C. Sergeant, USN, Technical Division Officer at the Electronic Supply Office, spoke to the conferees on the research program of ESO, explaining the methods used by the Navy to effect greater standardization of maintenance parts.

In summarizing the results of the conference, Captain E. F. Metzger, USN, Commanding Officer of ESO, stated: "We have accomplished our objective—to bring everyone up-to-date, to increase the interest of both supply and technical personnel in the Navy's electronic supply operation, and to encourage mutual participation in suggesting, recommending and developing improved methods of electronic material support."

Mobile Telemetering System Developed by NRL

A mobile telemetering system recently developed by the Naval Research Laboratory for missile guidance work combines a helical beam antenna with a servo-controlled rotating mechanism.

It operates in the 216 to 222 mc band, has a beamwidth of approximately 52 degrees in both vertical and horizontal planes, and a gain of 12 db over an isotropic circularly polarized radiator—6 db over a dipole. It can be preset in 10-degree steps in elevation and is servo controlled in azimuth, or train, with a maximum rate of turn of 38 degrees per second.

A helical beam antenna was chosen because of its inherent suitability for telemeter reception: (1) it receives any plane polarized wave equally well; (2) it has moderate gain with clean main lobe and small side lobes; (3) it is not critical in construction; and (4) its impedance is almost purely resistive and is broad-banded.

Since the antenna system is intended for use with a missile guidance radar, it may be required to track the same target and so must be capable of the same rotational velocity. In the telemetering of aircraft and missiles a beamwidth of 50 degrees has been found satisfactory in most instances provided the antenna is adjustable in elevation and controlled in train.

NATIONAL ELECTRONICS CONFERENCE

A record attendance of 7323 was recorded at the tenth annual National Electronics Conference held in Chicago during October.

The Conference presented an 86 paper technical program and 158 booths of exhibits by manufacturers foremost in the electronics field.

The technical program consisted of sessions on antennas, circuit theory, communications, computers, electronic circuits, electron tubes, electronic tube reliability, and magnetic amplifiers.

Also included were sessions on microwaves and microwave instrumentation, radar and navigation, servomechanisms and control, solid state devices and circuits, and television.

Dr. Alfred N. Goldsmith, Editor Emeritus, Institute of Radio Engineers, addressed the Conference, speaking on "Blasting Away Scientific Roadblocks." Dr. Goldsmith stressed the importance of technical symposia and praised the National Electronics Conference for the vital part it has played in unifying the electronics field, during the past ten years.

Another feature of the Conference was the presentation of the first National Electronics Conference Award to E. D. McArthur, manager of the electron tube section of the General Electric Research Laboratory, Schenectady, New York and E. F. Peterson, manager of marketing for General Electric's radar and television department in Syracuse, New York.

This award has been established to recognize papers that introduce developments of a new and revolutionary character to the electronics industry. These men were honored for their 1954 Conference paper entitled "The Lighthouse Tube; A pioneer Ultra-High Frequency Development."

Regional Signal Corps Supply Office Moves to Philadelphia

The Army Signal Corps Supply Agency has closed its New York Regional Office and transferred its functions to the Signal Corps Supply Agency headquarters at Philadelphia.

A four-member liaison group has been retained in the New York area at Long Island City, and will continue to furnish assistance and information to prospective Signal Corps suppliers.

It was pointed out that decreasing requirements for Signal Corps supplies and equipment have brought about consolidation and curtailment of procurement activities throughout the United States, and that procurement activities at the New York office have been waning for some time.

New Accuracy With Light Pulse Generator

A new tool of explosives research which makes possible improved accuracy in detonation, fragmentation and shock wave studies has been announced by the Department of the Navy.

Known as a light pulse generator, it is used in connection with extremely high speed rotating mirror cameras in the special photography required in explosives research.

(*Continued on page* 62)

V. I. P.

VERY IMPORTANT PRIVATE

Not rank, but *function,* determines a soldier's importance. This man is carrying, not just a Walkie-Talkie, but perhaps the fate of an army or a cause. Through him headquarters and other units keep informed; through him pass the orders that unite the efforts of many men into one resistless force. By creating, developing and producing a wide range of electronic equipment for all the armed services, RCA scientists and engineers are helping to provide every soldier, sailor, airman and marine with everything that modern electronics can contribute to military effectiveness, safety and comfort. Because the fighter of today must be trained to understand and operate this equipment, his status is higher than ever before and his opportunities correspondingly better.

RCA

GOVERNMENT DEPARTMENT
RADIO CORPORATION of AMERICA
ENGINEERING PRODUCTS DIVISION CAMDEN, N.J.

ITEMS OF INTEREST

Bursts of light are put on film at crystal-controlled intervals to make possible a calibration in intervals of five microseconds of the speeds of phenomena being observed.

Previously, basic research data were subject to errors of unknown magnitude because of the construction of the cameras or variations in the performance of the operators.

The present laboratory model will undergo design changes and modifications to be installed as a part of a rotating mirror camera and provide automatic calibration of speeds. With variations in design, the light pulse generator can have other applications. For example, it may prove useful in testing photocell circuits used in nuclear physics and in the motion picture and television industries.

Key to operation of the light pulse generator is a Sylvania Glow Modulator Tube, Type 1B59, well-known for its use in facsimile equipment for transmission of newspaper pictures.

Transistor Design Sheets Available from Westinghouse

A 10-page set of design sheets describing transistors and their application is now available from the Electronic Tube Division, of the Westinghouse Electric Corporation, Elmira, New York.

Design data is given for three new Reliatron transistors, P-N-P junction types 2N54, 2N55, and 2N56. General semiconductor theory is discussed and equivalent circuits and equations are derived for grounded-base, grounded-emitter, and grounded-collector connections.

Circuits for a phonograph preamplifier and an audio oscillator are shown to illustrate typical transistor applications.

Television

THEATER COLOR TELEVISION BY RCA

Development of an RCA theater color television system which projects large-screen television pictures in sizes up to 15 by 20 feet was described recently in a paper delivered before a meeting of the Society of Motion Picture and Television Engineers, in Los Angeles.

Theater color-TV equipment, developed out of the research which led to the development of the RCA compatible color television broadcast system, is already being used for demonstration and study purposes by the National Broadcasting Company at its Brooklyn, New York, color studio.

The new system projects theater-size color television pictures with good resolution and highlight brightness. The highlight brightness is approximately five foot-lamberts on an embossed aluminized screen. The combined kinescopes and optical systems utilize the full bandwidth of the color television signal.

The experimental system, which can also be used for theater projection of black-and-white television pictures, is basically similar to RCA's monochrome theater system. However, where the latter utilizes a single optical system, the color projector employs three 26-inch Schmidt-type optical systems—one for each of the three primary colors, red, green, and blue.

In addition, the color system requires a decoder, two additional video amplifiers, and increased scanning power.

The decoder is the heart of the system. It "extracts" the color information from the incoming video signal and combines it in proper proportion with the brightness information in the video signal to form the red, green, and blue signals. The red, green, and blue outputs drive the equipment's three television picture tubes.

Admiral Device Illustrates TV Circuit Troubles

The national service department of Admiral Corporation has put 21 television circuit troubles into one device which it has named the Dynamic Illustrator.

When the service instructor wishes to illustrate one of the circuit troubles, he flicks a companion switch and the service men immediately can see the effect this particular trouble has on the picture. They are also able to observe on the oscilloscope what this trouble does to the receiver's circuit.

The instrument was especially designed and built by Admiral service engineers and is the only such device capable of illustrating both correct and incorrect voltage waveforms through the use of cathode followers.

The Dynamic Illustrator, so named because it illustrates the dynamics of the television circuit, is a normal television set whose back has been replaced with a panel of 42 switches. 21 switches on the left side illustrate 21 possible circuit difficulties. The remaining 21 switches are used for viewing voltage waveforms of the television circuit under analysis.

Through the use of a strip of 16 cathode followers, an isolating device, the correct or incorrect voltage waveform can be viewed on the oscilloscope with no effect upon normal receiver operation.

When a switch is in position for the correct waveform, the dealer service men can see the picture as it should be on the screen. At the same time, they can see the correct waveform illustrated on the oscilloscope, a device which "x-rays" the impulses of a television circuit.

PATENT GRANTED ON CBS-COLORTRON

CBS-Hytron has recently announced that the United States Patent Office has granted patent 2,690,518 on the CBS-Colortron—the tube currently being used by leading color television set manufacturers.

This patent on the CBS-Colortron covers the design of a curved tricolor screen photographically printed directly on the inside face of the tube; and a curved shadow mask, supported free of lateral tension, through which electron beams from the three-beam electron gun are aimed at the screen.

Two Newburyport, Massachusetts, inventors, Norman F. Fyler and William E. Rowe, were granted the basic patent as assignors to Columbia Broadcasting System, Inc., of which CBS-Hytron is a division. The importance of their contribution to color television is emphasized by the fact that the CBS-Colortron's original curved screen-mask now is being adopted by other tube manufacturers.

Raytheon Demonstrates Microwave Relay System for Color Television

A demonstration of the KTR-100 microwave relay system, adapted for simultaneous color video and audio transmission, was recently held for engineers of American Telephone and Telegraph, Bell Telephone Laboratories, Western Electric and New England Telephone and Telegraph by the Raytheon Manufacturing Company of Waltham, Massachusetts.

The showing, which took place at the Raytheon Communications Engineering building in Newton, Mass., demonstrated that the KTR-100 has outstanding performance characteristics when passing simultaneous color video and audio intelligence.

(*Continued on page* 64)

"TV STATION" *in a suitcase!*

"As revolutionary as gun powder . . ." says a military authority of tactical television, latest communications device of the armed services.

In recent tests, pictures of amphibious landings, "prisoner" interviews, aerial reconnaissance were transmitted instantly to command posts by Raytheon's portable KTR-100 microwave relay.

The growing military and commercial uses of the KTR-100—both portable and in fixed locations—demonstrate clearly the versatility and reliability of Raytheon electronic equipment.

RAYTHEON

RAYTHEON MANUFACTURING COMPANY, WALTHAM 54, MASSACHUSETTS

ITEMS OF INTEREST

The equipment shown included a Raytheon KTR-100A microwave transmitter and receiver operating through a test attenuator, with flying spot scanner and a tape recorder for video and sound sources. A standard picture monitor and a color television receiver were used for display. A Tektronic Scope enabled the visiting engineers to analyze the audio, and video quality of the transmission.

The microwave relay equipment used for the showing is unique in that it makes use of interchangeable RF units which permit continuous tuning over the common carrier, broadcast and military bands. It is contained in four compact carrying cases which weigh less than 250 pounds when used with the standard four foot reflectors, yet it provides color video and simultaneous audio transmission over distances up to 25 miles.

Captain John Mittino and Sergeant First Class Kirby L. McCreary are shown above working the KIWAR/AAIWAR MARS rig at Worcester Polytechnic Institute in Worcester, Mass.

Photography

New Recorder Catches Rocket Hits

Two Navy scientists have put the pull of gravity to work to obtain a photographic record of aircraft rocket hits. The new gun camera device tilts a system of mirrors downward in proportion to the pull of gravity so that the rocket is under the camera's scrutiny for the full run to the target.

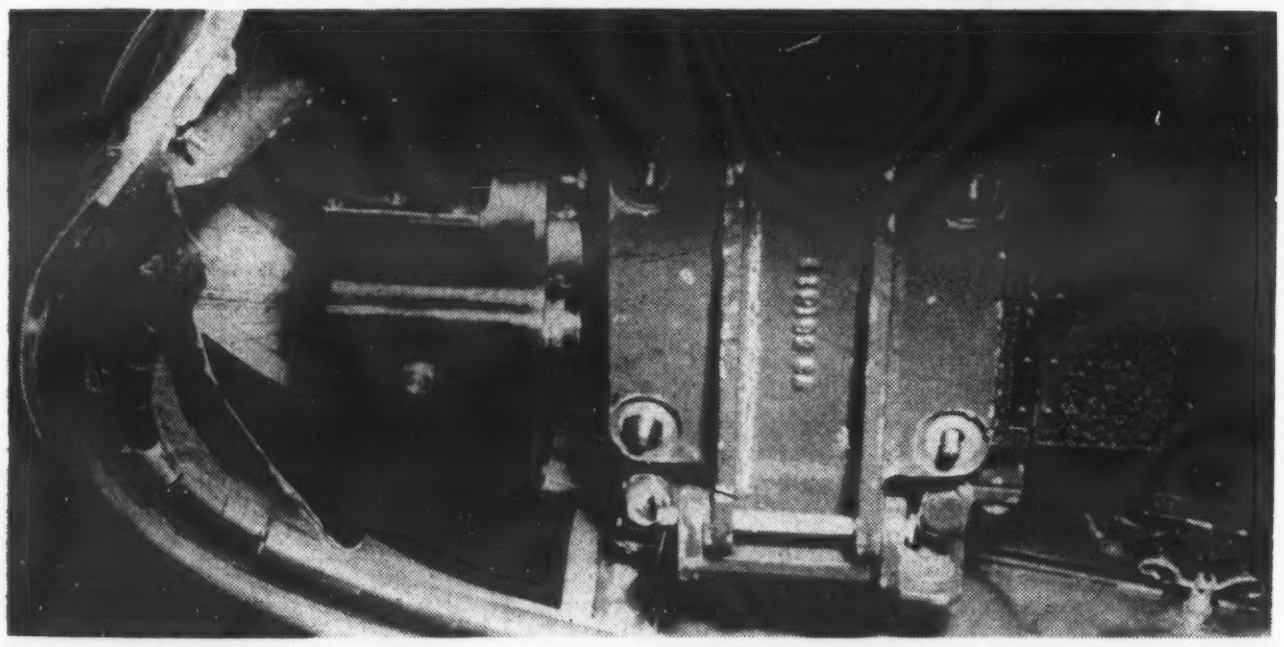
The inventors are Mr. John S. Attinello and Dr. Charles H. Harry, engineers in the Navy Bureau of Aeronautics. The two men recently received a cash award of $275 from Rear Admiral, Apollo Soucek, Chief of the Bureau of Aeronautics, for the invention, with the recommendation for a total cash award of $1000.

Called Automatic Depressor of the Optical Axis for Gun Cameras—ADOG for short—the attachment is small and weighs but a few ounces. The entire gun camera system is fully automatic requiring no attention from the pilot.

The fixed, forward looking gun camera carried on jet fighters formerly lost sight of the rocket when the pilot pulled out of his firing dive.

The new system made it possible to obtain the first accurate evaluation of air-to-ground rocket attacks in the Korean war. Information thus obtained will form the basis for development of standardized recorded data on rocket-firing.

Pictured below is ADOG, an Automatic Depressor of the Optical Axis for Gun Cameras, developed by two Navy scientists. It is shown installed in the wing of an aircraft.



New Tricolor Separation Negative Material and Process

A process based upon an entirely new principle of the silver solvent transfer theory and introducing a new and simplified technique of color negative making and duplicating has recently been announced.

The new negative material is said to provide, apart from its very high emulsion speed (29 degrees Scheiner or Weston 40), correct color and tone separation. It requires only normal black-and-white processing and produces, within two hours, three silver negative images for duping or printing purposes.

The new process offers the means of producing from any black-and-white single-strip camera material, three color separation negatives in silver images without stripping or printing through filters, and entirely without any integral or external masking.

As the new process uses only silver instead of dye images, it is likely to supplant the chromogenic types of negative materials now commonly available.

Professionals Eligible For Graflex Photo Contest

Professional photographers can compete in three out of five categories of the $10,000 Graflex photo contest, opening January 1, 1955 and closing March 1, 1955.

They will be eligible to submit entries in the regular professional class, a new industrial class, and the revised press class, provided they meet the requirements of the contest rules for each class.

The five categories are: press, industrial, professional, non-professional, and teen-age.

Feeling that industrial photography deserves special recognition, Graflex has announced that this year's contest will feature the new industrial class, with separate judging and separate prizes.

(*Continued on page* 74)

PERSONNEL CLEARING HOUSE

AFCEA Members Available to Industry

The pages of SIGNAL are open to active AFCEA members who are seeking positions in the communications, electronics and photographic industries. Any member is entitled to space free of charge in this column for three issues of the magazine. Please limit your notice to five lines. In replying, employers are asked to address: Box ....., SIGNAL, 1624 Eye Street, N. W., Washington 6, D. C. Letters will be forwarded to the AFCEA member.

PURCHASING EXECUTIVE. Navy, Signal Corps and Air Force electronics background. Knowledge of contract administration, material control. Box 104.

MARINE CORPS VETERAN with B.E.E. degree desires position in systems design. Two years experience in plant testing and field installation of analog computers for naval fire control systems. Box 105.

CONTRACT ADMINISTRATOR. 8 years specialized, responsible experience in government procurement as former Section Head in Navy Dept. and with electronics manufacturer, handling contract administration, negotiations, quotations, redeterminations, renegotiation, etc. Box 106.

USAR SIGNAL CORPS MAJOR. Telecommunications specialist with 14 years military and civilian experience. Background also in personnel management, procurement and contracting. Fluent French linguist. Presently on mission in Europe. Seeks position as company's European technical representative or other responsible position in Europe, France preferably. Box 107.

RETIRING USCG LCDR, 30 years communications-electronics experience, operational and supervisory. Six years as instructor and CO of radio op school; 1st class FCC commercial license. Available 1 Feb. 1955; New England area preferred. Box 108.

RADIO-TV TECHNICAL DIRECTOR. Six years' experience in drama and music program direction. BA in Programming and Production; technical background includes control room operations, equipment design, construction, maintenance. Age 26, married. Will complete tour as Microwave Instructor, The Signal School, June 1955. Prefer Chicago location. Box 109.

Government and Military Positions Available

Government and military agencies are invited to use this column to announce available positions which may be of interest to the readers of SIGNAL. Notices will be published three times if not cancelled before. Applicants apply as indicated in individual notices.

RADIO OPERATOR TECHNICIANS. Veterans $3400-$4200 to start. Overseas opportunities. Amateur or commercial licenses helpful. Full pay during advance training. Good advancement opportunities. Submit resume with name, age, address, phone number—if any, military experience, private training, work experience, FCC licenses—if any. Armed Forces Communications and Electronics Association will forward same immediately to employer who will acknowledge your application direct.

TELETYPE OPERATORS AND CRYPTOGRAPHIC TECHNICIANS. Veterans $3200-$3700 to start. Overseas opportunities. Full pay during training period. Good advancement opportunities. Submit resume with name, age, address, phone number—if any, military experience, FCC licenses—if any. Armed Forces Communications and Electronics Association will forward same immediately to employer who will acknowledge your application direct.

Applications are requested for electronic, aeronautical, mechanical, industrial engineering, editorial and photography positions located at the U. S. Naval Air Missile Test Center, Point Mugu, Port Hueneme, California. Applications, and requests for the complete Vacancy List of 39 available positions with salaries ranging from GS-5 to GS-13, should be addressed to: Mr. R. A. Riebow, Employment Superintendent, U. S. Naval Air Missile Test Center, Point Mugu, Port Hueneme, California. The following is one position open:

ELECTRONIC ENGINEER, GS-13, to be Systems Development Engineer in the Office of the Senior Development Engineer, Range Instrumentation Department, NAMTC. Will accept personal responsibility for developing new or improved electronic systems for trajectory measurement in the Sea Test Range and associated data-reduction facility.

THE SPECIAL DEVICES CENTER, Office of Naval Research, located 25 miles from New York City at Port Washington, Long Island, needs electronic and aeronautical engineers. Applicants must possess degrees in engineering, and pertinent electronic or aeronautical engineering experience. Apply to Mr. David A. Lana, Industrial Relations Dept., Special Devices Center, Office of Naval Research, Port Washington, N. Y.

NEW PRODUCTS from Industry

Raytheon Electronic Oven

Cooking by radar waves, in an oven in which nothing heats but the food itself, was recently demonstrated by the Raytheon Manufacturing Company of Waltham, Massachusetts.

Two commercial models of the microwave oven, known as the "Radarange," are currently in production. The larger of the two, the Model 1161, measures 26 x 26 x 64½ inches and provides a heating chamber which is 20 x 12 x 22 inches. The Model 1170 is a counter unit, 23 x 31 x 29¾ inches, with an oven which is 14 x 10 x 18 inches.

Heating is accomplished by microwave energy at 2450 megacycles, which is generated by QK-390 continuous-wave, air-cooled magnetrons.

The microwaves penetrate the food to a depth of about 2½ inches. As they penetrate, they set up molecular friction deep within the food, which in turn creates heat, thus eliminating the need for time-consuming conduction.

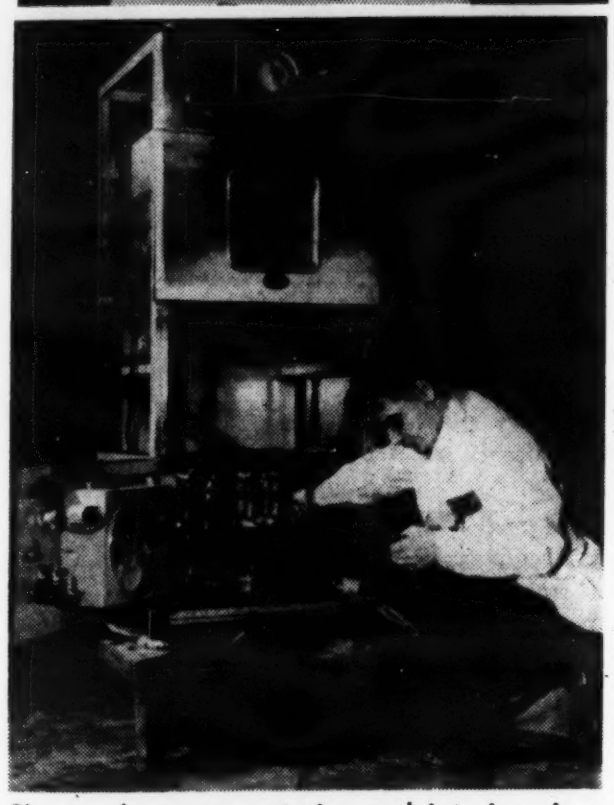
Current control is accomplished with a saturable reactor circuit in series with the primary of the high-voltage transformer. The reactor is also used to provide lower oven heats by reducing the magnetron current. This is a particularly convenient way to control heat, as all switching can be done in the low current control circuit rather than in the power circuit.

Electromagnet from Varian

A new laboratory electromagnet embodying the most convenient features for varying magnetic field configurations was announced recently by Varian Associates, Palo Alto, California, manufacturers of klystron tubes and n-m-r spectrometers.

Varian's new magnet, the V-4004, has two fixed energizing coils with adjustable poles and readily changeable caps. A wide range of field contours can be set with ease. By a simple adjustment of each pole, any air gap width up to 4.3 inches can be achieved.

A variety of cylindrical, conical or specially-shaped pole caps are available for wide choice of flux patterns. Despite the comparatively small size of this new magnet, a cap field flux density as high as 28,600 gauss can be attained.



Shown above are exterior and interior views of Raytheon's Model 1161 "Radarange," the electronic food oven. Maintenance has been simplified through improved circuitry, better accessibility and design improvements.

Color Control Devices by G-E

Two new devices developed for the photographer have been announced recently by General Electric Company.

Designated the Variable Color Filter Type PA-1 and the Color Control Meter, the devices are expected to open new frontiers in pictorial artistry.

The color correction of the Variable Color Filter may be predetermined by use of the Color Control Meter, which measures the red/blue balance of natural light, and thus the correct filter. The filter permits control of color balance, contrast, color saturation, sky brightness, and specular reflections.

The filter consists of two essential parts: a rear element and a front element. The rear element is a dichoric filter that appears yellow when the incident light is polarized along one of its axes. The color appears bluish when the incident light is polarized on the other axis at right angles to the first. When the incident light is polarized along any intermediate axis various shades of yellow to blue through neutral may be obtained.

The front element of the filter is a polarizer. Incident light on the rear element is polarized in line with the axis of the front element. As the front element is turned with respect to the rear element, the color of light transmitted by the combination varies from yellow to blue through neutral.

A scale is contained in the front element which indicates the transmitted color as shown from the corresponding position of the reference mark on the rear element. The photographer can then preset the desired color before placing the filter over the camera lens.

Bendix Test Unit Improves Stroboscopic Observation

A new portable, self-contained, electronic test device for vibration and shock analysis has been marketed by the York Division of the Bendix Aviation Corporation, York, Pennsylvania.

This unit represents a big advance in stroboscopic observation, the use of a synchronized light source to observe the effect of vibration and shock on many of today's industrial products.

Termed "Flash-Lok", the new unit eliminates the time-consuming adjustments required of former methods to synchronize the speed of light flashes with the vibration of the object being tested.

Excitation for the "Flash-Lok" is derived directly from electrically driven vibration equipment, or from an accelerometer attached to mechanical equipment. The light source flashes at a one or five cycle rate differing from the vibrating base in order to observe either slow motion, for detailed study and analysis, or fast motion for general detection of

(*Continued on page* 68)

resonances. The light flashes may also be locked exactly to the vibration frequency if desired.

The unit is furnished with one 1D21 flash lamp, reflector and connecting cord as standard equipment. It weighs less than 21 lbs. and measures only 9½" high, 8¼" wide, and 12½" deep. The unit operates from a standard 115-volt source and requires only 65 watts of power.

Signal Generator from Precision Apparatus Co.

Precision Apparatus Company, Inc. announces a new basic test instrument, the Model E-300 Sine-Square Wave Signal Generator, covering the audio-video range. This instrument was especially developed to answer many modern electronic amplifier testing problems which cannot be handled with the usual complement of test instruments.

Model E-300 provides accurate sine and square wave signals for direct performance testing of high fidelity audio amplifiers, television audio amplifiers, carrier current systems, and other wide-range devices.

Because sine-square wave testing is a most reliable indicator of frequency response, phase shift, amplitude distortion, etc., analysis with the Model E-300 streamlines amplifier test procedure and permits more uniformly high standards of apparatus performance and adjustment.

Kodak Attachment for Color Photography on Market

To make precision close-up color photography easier, the Eastman Kodak Company has recently announced a new technical close-up attachment.

The attachment is offered in two forms. One, for making close-ups with a Kodak Pony 135, Model B or 828 camera, is known as the Kodak Pony 135 Close-Up Kit. This includes the framing attachment, supplementary lens and filters, and special close-up flashguard. The other, called the Kodak Technical Close-Up Outfit, includes the Kit, Kodak Pony 828 Camera, flasholder, and attachments, all in one package.

The Close-Up Outfit is built around a simple, sturdy frame to which camera and flasholder are attached. A half-frame is mounted out in front of the camera on two arms which extend from the plate.

The mounting plate holds the camera rigidly and positions the flasholder so that the light is beamed correctly. The half-frame in front of the camera accurately outlines the field of picture coverage, 3" x 4" at a distance of 6". To position the camera at the correct distance the operator merely places the frame at the subject area to be photographed.

Use of a half-frame rather than a whole frame eliminates the shadows which a full frame would cast when the camera is used outdoors. The half-frame is clearly marked with dots and notches which indicate accurately the slightly different fields of coverage of 35mm and 828 camera so that the operator can visualize the exact center of his picture.

Voltage Regulated DC Power Supply

An economical, voltage regulated, DC power supply has been designed by Polytechnic Research and Development Company, Inc., Brooklyn, New York, for general laboratory and production line use and to provide power for low voltage klystrons.

Designated PRD Type 807, it features a wider than usual output range with a B supply ranging from 0 to +600 v., 0 to 200 ma, and a C supply from 0 to —250 v., 0 to 5 ma. It will provide klystrons with up to —600 v. cathode voltage and an additional 0 to —250 v. for the reflector. Higher voltages may be obtained through "stacking" two or more units because none of the supply voltages are grounded to the chassis.

Type 807 can be furnished to operate from either 115 or 230 volts a.c., 50/60 cps, single phase. A panel voltmeter and milliammeter are supplied.

Packaged Circuits Utilize Etched Circuitry

A new departure in packaged circuitry utilizing circuits etched on impregnated teflon has been introduced by Audio Products Corporation of Los Angeles, California.

Available under the trade name "Pakaps" the new line is offered in three series having wide application in computer and airborne instrumentation, laboratory equipment and high fidelity audio amplification.

Standard series 100 and miniature series 200 perform such functions as low, medium and high speed binary scalers, cathode followers, multivibrators, pulse formers, pulse shapers, ring counters and gates.

Series 200 is available either non-hermetically sealed (200-C), or completely hermetically sealed (200-H). This meets and exceeds MIL-E-5400 for airborne electronic equipment.

Taylor Introduces New Xenon Thyratron

A new 6478 Xenon Thyratron has been announced by Taylor Tubes, Inc., Chicago manufacturer of high vacuum power tubes, gaseous rectifiers and special purpose tubes.

The Taylor 6478 meets the exacting electrical and mechanical requirements for reliable airborne operation at high altitudes. The small size and flexible anode lead makes the tube ideal for applications where space is limited.

It has a maximum operating voltage of 1500 volts AC. Continuous anode current is 1.5 amperes and the continuously recurring peak anode current is 20 amperes. Filament current is 7 amperes at 2.5 volts.

The tube features a maximum deionization time of 80 microseconds. Ambient temperature limits are —75°C to +85°C. Maximum cathode warm up time is 15 seconds.

Tiny Speaker-Microphone Developed by Telex, Inc.

Small size, quality performance, and low cost have been combined in a new dynamic speaker-microphone by Telex, Inc., St. Paul, Minnesota, manufacturers of hearing aids and electronic components.

Designated Model #100, the unit is housed in a steel and thermoplastic case which can be mounted in the microphone housing of dictation machines, portable radio transceivers and other electronic apparatus where a transmitting-receiving unit is desired. An externally-mounted miniature transformer for matching the microphone to the grid circuit is available.

Dimensions of the speaker-microphone are 1" x 1" x ¾".

(*Continued on page* 70)

Pictured below is the new dynamic speaker-microphone, developed by Telex, Inc., which will deliver 120 decibels of sound pressure.

. . . Hallicrafters broke it 21 years ago!

Breaking the barrier of sound is new insofar as planes are concerned. But it was more than two decades ago that Hallicrafters started producing communications equipment of equal capabilities. Today, Hallicrafters is busily engaged as a "primary producer" in the development and production of Communications Equipment for the United States Air Force, Signal Corps, Coast Guard and Navy. These all-important assignments are production jobs which take full advantage of all that Hallicrafters 21 years of experience and reputation imply.

World's leading exclusive manufacturers of communications radio

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COMMUNICATIONS EQUIPMENT • COUNTERMEASURE EQUIPMENT • COMBAT INFORMATION CENTER
HIGH FREQUENCY ELECTRONIC EQUIPMENT • MOBILE RADIO STATIONS • MOBILE RADIO
TELETYPE STATIONS • PORTABLE TWO-WAY COMMUNICATIONS EQUIPMENT • RADAR RECEIVERS
AND TRANSMITTERS (ALL FREQUENCIES) • RADAR EQUIPMENT

NEW PRODUCTS

Winston Announces New Test Device

A new test instrument designed to produce white dot and bar patterns for use with color or monochrome television receivers, has been announced recently by Winston Electronics, Inc. of Philadelphia.

Identified as model 160 white-dot linearity generator, the instrument provides both large and small white dots for ease of tri-color kinescope receiver convergence adjustments plus vertical and horizontal bars for sweep circuit alignment. Internally generated vertical sync pulses, locked to line frequency, insure stable operation.

Additional features are RF carrier outputs and external modulation provisions.

New AC Electronic Voltmeter

The Electronic Engineering & Service Company of Falls Church, Virginia has recently introduced a new electronic voltmeter for laboratory and commercial applications.

Designated model E-33, the instrument is designed to indicate voltages from 500 microvolts to 500 volts. The frequency range extends from 10 cycles to 1 megacycle. It is operated from a 105-130 volt 60-cycle power source. Power consumption is 15 watts.

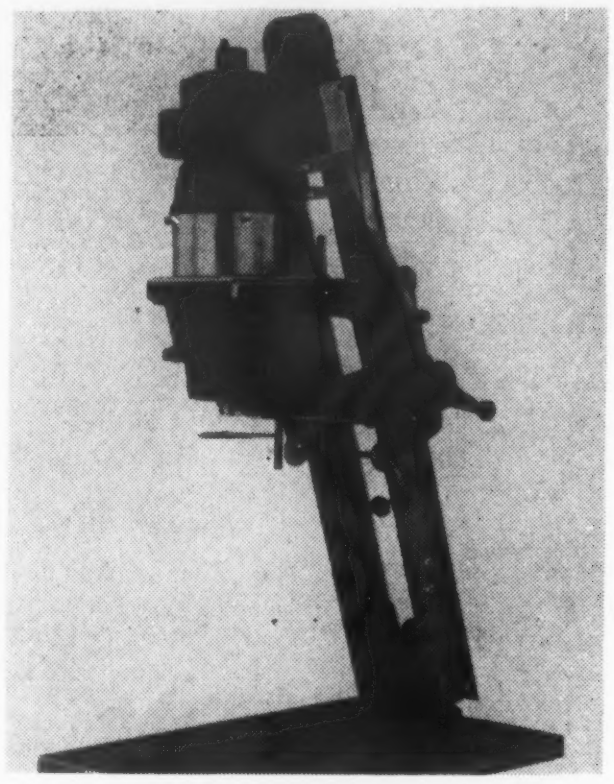
The instrument consists essentially of an attenuator, a multistage feedback amplifier, and a Germanium diode full wave bridge. The meter is specially designed with shaped pole pieces so that the indications are proportional to the logarithm of the rectified current over a range of 10 to 1.

NAER High Voltage Vacuum Switch

The North American Electronic Research Corporation of Los Angeles, California, has recently developed a vacuum switch ideally suited for switching purposes in DC pulse systems, especially in radar installations. It can also be used in many circuits where the switching current and the isolation of high voltage is required.

For pulse application, switching is done under no-load conditions. The breakdown test voltage between open contacts is 20 kilovolts DC.

The external electromagnetic coil is located axially over the arm of the switch which contains the soft iron core.



The Omega manual focus enlarger

New Version of Omega Enlarger Offered by Simmon Brothers

The Omega D-2, famous 4" x 5" manual focus enlarger, is now being introduced in a modernized version by Simmon Brothers, Inc. of Long Island City, New York.

Use of a heavier and wider extruded girder has increased the strength and rigidity, making the enlarger capable of withstanding even greater vibration without endangering sharpness. A gearless friction type focusing mechanism gives precise finger-tip control. As a new feature, a hand wheel with a rack and pinion movement allows the operator to adjust the enlarger quickly and smoothly for any size print desired.

As before, major parts, lens, negative holder, and baseboard are carefully aligned with precision instruments and locked in place at the factory to insure maximum accuracy and dependable performance even under hard daily use.

Interchangeable double condensers, which are factory-matched to the lenses, offer high output and give maximum evenness of illumination for every lens. They are quickly and easily changed so as to eliminate time loss even in commercial work.

New High Speed Roll Films From Kodak

The Eastman Kodak Company has announced the introduction of a new high speed, roll film, Kodak Tri-X.

The film, which is approximately twice as fast as the company's current Kodak Super-XX Film, is intended for amateurs, professionals, and business and industrial use.

Available in 35mm, 4 x 5 film pack and 620 and 120 roll film sizes, Tri-X films incorporate the same basic emulsion characteristics as the recently introduced Kodak Royal Pan Sheet Film.

Exposure and development latitude of Kodak Tri-X film is described by Kodak as "exceptional." Considerable over or under-exposure can be tolerated and excellent prints still obtained.

Speed of the new film is so great that it will extend the picture taking day for owners of simple box type cameras having a fixed lens aperture and single shutter speed.

Waveguide Quick Disconnect From Aircraft Armaments

The Commercial Products Division of Aircraft Armaments, Inc., Baltimore, has developed a waveguide quick disconnect which provides a reliable method of rapidly making and breaking waveguide connections.

No tools of any kind are required after installation of the disconnect on the choke end of a joint. Connections are made by simply inserting the flange end of the joining piece into the disconnect and hand tightening the outer ring. Proper alignment is automatic.

In addition to its uses as a piece of laboratory equipment, the disconnect is well suited for incorporation in microwave test sets as a front or rear panel fixture. It is available in sizes to fit the standard chokes and flanges of Types RG-51/U, RG-52/U, and RG-91/U waveguides.

Korona Announces Improved Model of Foto-Roll-70

Korona Camera Works, a division of Gundlach Mfg. Company of Fairport (Rochester), New York, has announced an improved model of its Foto-Roll-70, following six years of field operation and extensive laboratory development of improvements recommended by users.

The unit replaces normal film-holders on portrait, view or copy cameras with a roll of 350 exposure day-light-loading 70 millimeter film.

The Korona Foto-Roll-70 is mounted on the camera in place of the normal ground-glass on the camera. The unit is essentially a sliding back complete with ground glass and a carriage with the roll film mechanism. A precision counter is built into each unit to record the number of exposures made.

(Continued on page 72)

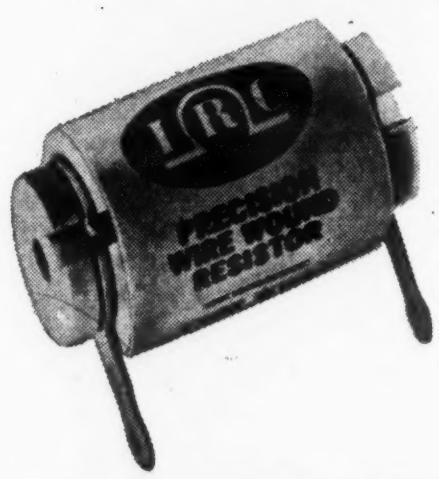
NOW

IRC *encapsulated* precision resistors

The presence of extreme climatic conditions, unusual ambient temperatures or salt water are offset by a new IRC encapsulating technique. This IRC development uses an epoxy resin compound for both the winding form and the seal. A special molding process avoids air pockets and assures even, complete distribution of the resin. Designed to operate at 125° C. and to meet the military requirements of salt water immersion, these units exceed MIL-R-93A specifications in 1%, 0.5%, 0.25% and 0.1% tolerances.

Also available for MIL Applications . . .

IRC TYPE WWJ Precision Wire Wounds



In 6 MIL-R-93A styles, plus miniature type WW10J IRC Precision Wire Wound Resistors offer full coverage of requirements for exacting accuracy in critical applications. IRC's superior winding skill and care is the result of over 25 years experience.

Voltmeter Multipliers • Boron & Deposited Carbon Precisions • Insulated Composition Resistors • Power Resistors • Controls and Potentiometers • Low Wattage Wire Wounds • Germanium Diodes

Wherever the Circuit Says

Precision Wire Wounds • Ultra HF and HI-Voltage Resistors • Low Value Capacitors • Selenium Rectifiers • Insulated Chokes • Hermetic Sealing Terminals

IRC

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Send Technical Bulletin ☐ D-3 Encapsulated Precisions
☐ D-1 Type WWJ Precisions

*Name*_____
*Title*_____
*Company*_____
*Address*_____
*City*_____ *State*_____

Use of the unit eliminates loading, unloading, carrying and handling of two-exposure film holders, yet does not affect the photographer's ability to develop his film intermittently during the length of the 350 exposure roll.

Foto-Roll-70 is available for 5 x 7 and 8 x 10 cameras, and is custom fitted to individual models.

New Electronics Dictionary

Allied Radio Corporation of Chicago, Illinois, has announced the publication of a completely revised edition of "A Dictionary of Electronic Terms" containing over 3,500 terms used in television, radio and industrial electronics.

This new publication, edited by Gordon R. Partridge, Ph.D., Associate Professor of Electrical Engineering, University of Purdue, answers the need for an accurate, up-to-date reference source of words used in the electronics field.

Definitions cover mostly modern techniques and equipment, but range from many words no longer in general use, retained for historic reasons, to the new language of color television and the electronics of nuclear physics.

A 6" x 9", 72 page booklet, this publication is available from Allied Radio Corporation for 25c to cover handling and mailing costs.

New Switches for Missile Timing Tests

Donald P. Mossman, Inc., Brewster, New York, has announced an interesting application of their lever switches in the timing of guided missiles undergoing performance tests.

Mossman engineers collaborated with Electronic Engineering Company of California in the adaptation of special switches incorporated in the console of the dual timing signal system developed for the Air Force by the California concern. The unit consists of two separate time signal generating systems plus the console which controls their operation.

Function of the system is to provide accurate timing data on missiles being flight-tested at the Air Force Missile Test Center, Cape Canaveral, Florida. Information which the system furnishes is coordinated with radar and photographic data to supply technicians with the means of accurately evaluating a missile's performance at any given instant during flight.

Vistascope Anamorphic Lens

J. L. Galef & Sons, Inc. of New York have recently announced their appointment as sole U. S. agent for the Vistascope Anamorphic Lens for wide dimension 8mm and 16mm motion pictures, developed by Dr. Albert Bouwers of Holland.

Vistascope is a double purpose coated lens which is used on both camera and projector and gives the camera a 36 degree lens angle—50% more than with present 24 degree standard lenses.

When attached to 8mm and 16mm cameras, the Vistascope lens takes squeezed wide vision pictures. The same unit when attached over a regular projection lens, expands them for wide screen motion picture presentation.

Since, to a large extent, depth perception is due to peripheral vision, this wide screen process provides remarkable realism, and a feeling that the viewer is actually present and a part of the scene on the screen.

JFD Piston Capacitor

The Electronics Division of JFD Manufacturing Company, Brooklyn, New York, has just completed development of a new variable trimmer piston capacitor, Model VC-13G.

The VC-13G expansion piston has a traverse motion, free from mechanical backlash, giving smooth capacitance tracking over the complete range. There is a rigid grip at all times between the piston and inner wall of the di-electric tube. The capacitor is thus relatively free from effects of vibration and shock. The positive wipe, due to the constant spring tension of the moving parts, assures good R.F. contact and low noise ratio.

Temperature stability of the VC-13G enables it to operate continuously beyond 125° and below —55°C.

Pressure Transducer From Technology Instrument Corp.

Technology Instrument Corp. of Acton, Massachusetts, has announced a dual element air flow differential pressure transducer, specifically designed for high output to speed-altitude-time computers, telemeter systems, electric recorders, servo systems, meter display or alarms.

The pressure response movements of each of two metal bellows is translated into motion of sliders of paired precision potentiometers. One bellows is connected to the dynamic pick-up line from Pitot or Venturi; the other bellows is exposed to pressure from the pick-up sampling the static or ambient pressure.

The electrical outputs of each of the instrument's four potentiometers are individually brought out to terminals, providing individual access to dynamic or to static data.

Cathode-Ray Recording Oscillograph

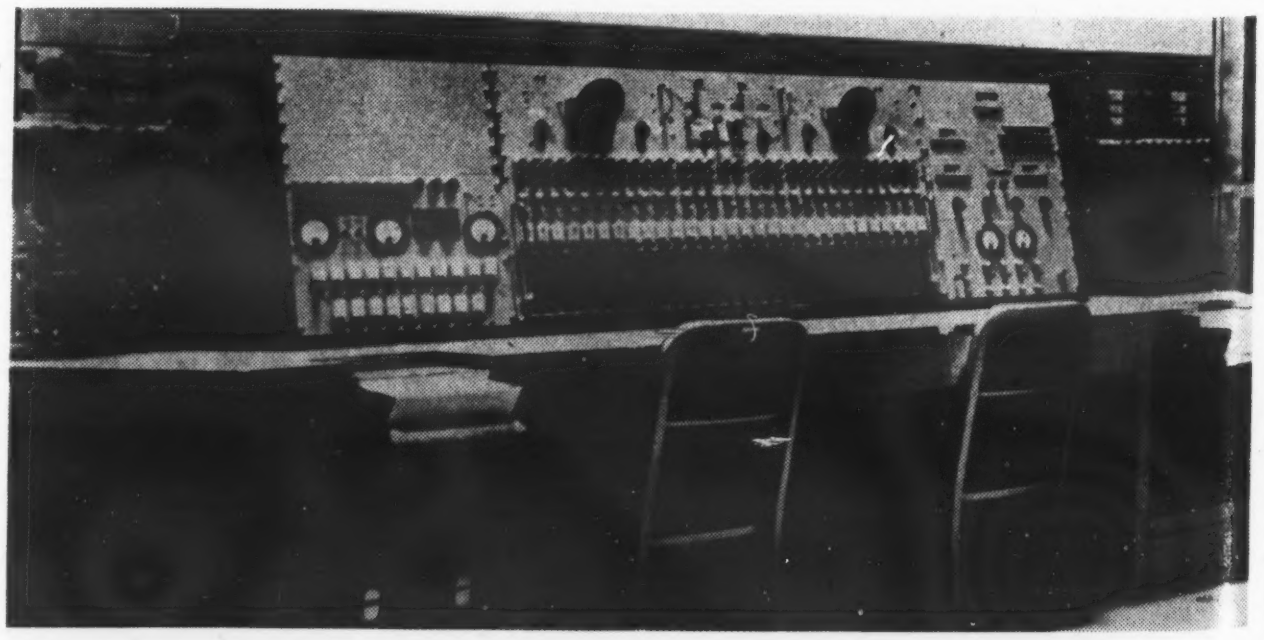
A complete, high-precision recording system, developed by William Miller Instruments, Inc., Pasadena, California, extends the useful range of multi-channel recording from static conditions to frequencies as high as 250,000 cycles per second.

A precisely correlated time history of up to 16 high-frequency phenomena is obtained on a single 8-inch wide record of exceptional clarity.

Unusually stable circuitry and a patented Miller precision optical system combine to provide precise, drift-free signals recorded as traces comparable to those obtained on the widely used Miller galvanometer-type recording oscillograph. Operation has been reduced largely to push-button control, and all chassis are designed and located for maximum accessibility.

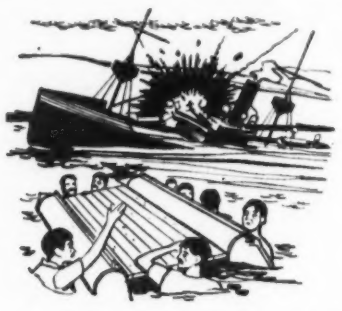
(*Continued on page* 74)

Below is the console of the Mossman dual timing system developed for the Air Force.



"¡Valiente!" cried the Spanish admiral

He cheered as his launch fished this man and seven more waterlogged American sailors out of Santiago Harbor, Cuba, on the morning of June 4, 1898. This was straining Spanish chivalry to the breaking point, for Richmond Hobson (right) and his little suicide crew had spent the previous night taking a ship into the harbor entrance under a hail of cannonade and deliberately sinking her to bottle up the Spanish fleet.



Hobson, who planned and supervised every detail of the operation, from placing the scuttling charges to dropping anchor under fire, was actually an engineer, not a line officer.

In Santiago Harbor, he led his first and only action against the enemy. But his cool-headed daring made him as much a hero of the day as Admiral Dewey. And proved again that America's most valuable product is Americans.

These Americans—proudly confident of their nation's future—are the people who stand behind United States Series E Savings Bonds. They are the people who, by their spirit and abilities, make these Bonds one of the world's finest investments.

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It's actually easy to save money—when you buy United States Series E Savings Bonds through the automatic Payroll Savings Plan where you work! You just sign an application at your pay office; after that your saving is done *for* you. And the Bonds you receive will pay you interest at the rate of 3% per year, compounded semiannually, for as long as 19 years and 8 months if you wish! Sign up today! Or, if you're self-employed, invest in Bonds regularly where you bank. They're as safe as America!

For your own security—and your country's, too—

invest in U. S. Savings Bonds!

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NEW PRODUCTS

Viewpaque, New Projector Attachment Announced

Viewlex, Inc., Long Island City, New York, makers of precision slide or combination slide and film-strip projectors and other audio-visual products, now have engineered a new attachment which transforms every Viewlex slide or slide and film-strip projector into a low cost opaque projector.

This Viewpaque attachment projects opaque objects of any size with life-bright clarity and brilliance, in full screen size.

It can be used for projection to audiences, close-up study of small detail and as a model for drawings.

Heinemann Introduces New Circuit-Breaker Switch

A 100 ampere circuit breaker safety switch has been introduced by Heinemann Electric Company of Trenton, New Jersey. The unit is designed for service on 120/240 volts AC, in two or three wire installations.

It incorporates two single-pole Heinemann hydraulic-magnetic circuit breakers with handle extensions attached to form one double-pole unit, allowing both circuit breakers to be switched on or off together.

Heinemann circuit breakers in the unit have inverse time delay to prevent nuisance tripping. Minimum and instantaneous trip points are unaffected by heat or cold, so that safe use of full capacity of the wiring is assured.

Phaostron Custom Meters

A new line of 2½" - 3½" custom meters, said to incorporate most ruggedized features demanded under specification MIL-M-10304, has been recently announced by Phaostron Company of South Pasadena, California.

Pointing out that plastic-cased instruments have been known to deviate up to 35% from their original calibration, Phaostron engineers state that the new shielded, sturdy metal-cased Phaostron custom meters assure permanent 2% reading accuracy.

Phaostron custom instruments feature large easy-to-use front zero adjustments and are available with either round or square bezels. They are manufactured in AC and DC models and Null Indicators.

ITEMS OF INTEREST

(*Continued from page 64*)

K1WAR Completes New Station

A new and powerful addition to the Civil Defense and Military Affiliate Radio System (MARS) networks has recently been completed at Worcester Polytechnic Institute in Worcester, Massachusetts.

Members of the ROTC staff of the Signal Corps ROTC unit and cadets have completed work on a 400-600 watt installation which includes provisions for radio teletype either manual or 60 word-a-minute.

Also available are a 120 watt Viking transmitter and an S-76 receiver for use of the 10, 20, 40 and 80 meter amateur bands.

A military type FM transmitter-receiver (the Radio Set AN/GRC-7) is also available for communication on the 6 meter band with other hams or on the local Civil Defense network. The radio teletype equipment uses the radio transmitter BC-610 in common use by many such MARS stations on 20, 40, and 80 meters and two Collins 388 receivers for diversity reception.

The antenna system used by K1WAR/AA1WAR is mounted atop a three story building on the WPI campus. Since the school itself is situated on a large hill, the addition of the 30-foot tower gives a particularly good location for both transmission and reception. The beam is a 3 over 4 element, 20 over 10 meters wide spaced beam which is selsyn motor driven by remote control from the ham station.

New DOD Directive for Mobilization Base Maintenance

(*Continued from page 36*)

"2. Data assembled on essential mobilization suppliers by the industrial mobilization planning of these agencies shall be used in planning current procurement. The policy of using contractors and facilities essential to the mobilization base is considered to be in the best interest of the Government. Suppliers that are deemed to be part of the mobilization base normally will be invited to participate in appropriate current procurement."

"ACTION

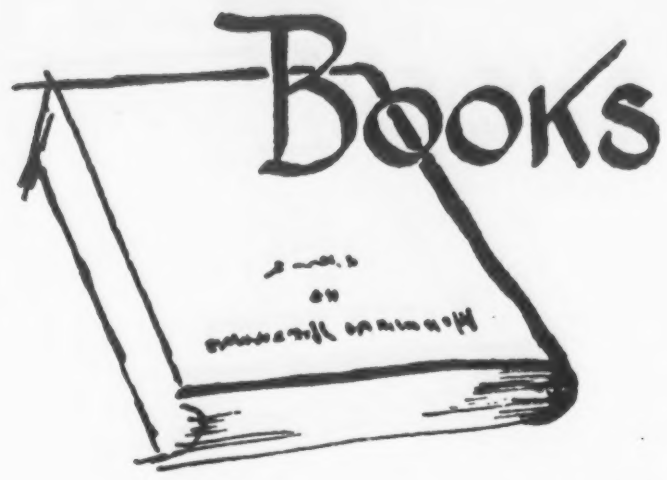
"In furtherance of this policy and to integrate current procurement with military mobilization plans, the military departments are requested to review proposed procurement of items contained in the Department of Defense Preferential Planning List. Responsibility for such review should be maintained at the level of the Procurement Secretary or their authorized designees. Such review should take into consideration the following:

a. Maintaining multiple sources of supply;
b. Geographic dispersal;
c. Avoidance of undue concentration of contracts in a few leading suppliers;
d. Multiple awards;
e. Preservation of essential skilled labor forces;
f. Utilization of existing open industrial capacity;
g. Preservation of essential management organization and "know-how";
h. Maximum subcontracting, and
i. Any other factors relevant to maintaining a sound mobiliation base.

"In carrying out this program, it is expected that the authority contained in Sections 2(c)1 and 16 of the Armed Services Procurement Act will be utilized. In this connection, comparative price experience shall be utilized to negotiate the best possible price for the Government."

* * * *

For an explanation of the Department of Defense Preferential Planning List and other departmental lists, an article entitled "The Hook-Up for Industrial Logistics" by J. Lewis Powell appears on page 24 of this issue. In this article Mr. Powell explains in detail the overall mobilization base policy.



TELEVISION. Second Edition. By V. K. Zworykin and G. A. Morton. John Wiley & Sons, Inc., New York, N. Y. 1037 pages, $17.50.

In the fourteen years since this book was first published, engineering development in television has been so profound that, in preparing the second edition, the authors have had to revise or completely rewrite a number of chapters on aspects which have become important in recent years.

A special feature of the new edition is its detailed discussion of color television. Its consideration of both the theoretical and practical aspects is detailed enough to give the reader a sound working understanding of this new and important development. Also new in this edition is a comprehensive discussion of industrial television and other related topics.

The problems of television are presented from the standpoint of the fundamental physical processes involved. At the same time the technical coverage is broad, with detailed considerations of the practical construction and operation of television devices. The careful analysis offered by the authors permits the reader to establish limits of performance for both ideal and practical television tubes and equipment.

VALVES FOR A. F. AMPLIFIERS. By E. Rodenhuis. Philips' Technical Library, Elsevier Press, Inc., New York, N. Y. 152 pages, $2.25.

Although several kinds of good amplifiers are available on the market, many radio amateurs prefer to build their own. This booklet of 152 pages with 97 illustrations shows the radio designer and amateur setmaker how this can be done.

The book takes him through the principles of construction on the basis of a schematic diagram, to the design of equipment according to his own ideas and specifications. Much space has been devoted to the specification of the components, their layout on the chassis, the method of assembly, tone controls and mixing circuits.

An important part of the book is that which deals with the design of eight complete amplifiers. It comprises a series of designs for an output of from 3 watts to 100 watts which are by no means drawing-board examples.

With its many supplemental tables of valves and components, this book should prove useful for reference purposes.

EXPERIMENTS IN ELECTRONICS AND COMMUNICATION ENGINEERING. Second Edition. By E. H. Schulz, L. T. Anderson, and R. M. Leger. Harper & Brothers, New York, N. Y. 342 pages, $6.00.

The first edition of this text, published in 1943, was designed to serve the needs of both college level courses and the numerous war training programs of World War II. Because of its unique coverage of experimental work over the entire range of the electronics field, it has continued to be widely used in electrical engineering courses.

The authors have now revised the text, eliminating many of the elementary experiments to permit more attention to basic principles, and simplifying the presentation of the others to permit more attention to correlating results with theory.

The text includes experiments ranging from electronic instruments, basic tuned circuits, vacuum tube characteristics, and transistors to complete video amplifiers, radio receivers, radio transmitters, antenna, and microwave equipment.

The experiments are presented as clearly and completely as possible, with sufficient information given to enable students to proceed with a minimum of verbal instruction.

ELECTROACOUSTICS. By Frederick V. Hunt. The Harvard University Press and John Wiley & Sons, Inc., New York, N. Y. 260 pages, $6.00.

Electroacoustics has both shared in and contributed to the growth of the communications industry. Professor Hunt has turned this interplay into a fascinating narrative based on original sources, personal interviews, private correspondence, and a unique review of the pertinent patent literature.

Some of the new and hitherto unpublished material deals with such topics as the origins of echo ranging, the crystal oscillator, electrostatic transducers, and the evolution of the dynamic loudspeaker.

Acoustical, radio, and audio engineers, physicists, historians of science, audiophiles, and high-fidelity enthusiasts will each find topics of interest in this book.

There is new historical material on loudspeakers and on the origins of each of the major types of transduction mechanism; new material dealing with the problem of antisymmetry in electromagnetic transducers; the first unified treatment of both electrostatic and electromagnetic systems; and new analytical results on the control of distortion in electrostatic loudspeakers.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, etc., required by the act of Congress of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946, of SIGNAL Magazine, published bi-monthly at Washington, D. C., (additional entry, Baltimore) for October 1954.

District of Columbia }
City of Washington } ss.

Before me, a notary public, in and for the State and County aforesaid, personally appeared George P. Dixon, who, having been duly sworn according to law, deposes and says that he is the Editor of the SIGNAL Magazine and that the following is, to the best of his knowledge and belief, a true statement of the ownership and management of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946, to wit:

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GEORGE P. DIXON,
Editor.

Sworn to and subscribed before me this 14th day of September, 1954.

(Seal) WANDA L. HEATHERLY,
Notary Public.

(My commission expires 31 August, 1957)

The Navy's Stake in Underwater Acoustics

(*Continued from page* 30)

In underwater sound, almost more than in any other scientific field, the responsibility for research designed to meet Navy needs rests with the Navy. The Navy is practically the sole user of underwater-acoustic devices, so there is virtually no industrial support for this kind of research. Furthermore, since undersea warfare is a Navy responsibility, the other military services do not perform research in this area.

* * *

To maintain a truly comprehensive effort in underwater acoustics—that is, an effort that covers all the areas necessary to meet our obligations to the Fleet—involves a broad span of activities. . . . The work involves a score of different scientific disciplines — physics, chemistry, oceanography, the material sciences and biological sciences, all important to our program.

The work done in these areas must all be brought to bear upon the Navy's problems in the field of underwater sound. With so many scientific disciplines involved, the work is bound to require a great deal of integration. It is the responsibility of the Office of Naval Research to bring about this integration, and to see that the results of these research programs are made available for use in the development programs carried on by the Navy's material bureaus.

These programs must be coordinated. The field of underwater sound provides an exceptionally good example of the scope of this problem of planning and coordination of military research and development. On the scientific side, we must support research in several different fields. On the military side, we must develop a wide variety of equipments and techniques for numerous applications.

* * *

In the Navy this coordinating role is filled by the Office of Naval Research. *The primary job of the Office of Naval Research is to plan and encourage scientific research.* In addition, ONR is the supporting activity that ties together the various programs of the other research activities of the Navy, and likewise coordinates their development programs.

The actual coordination of research and development in the Navy is accomplished in a number of ways. It is difficult to summarize with any precision because of the very nature of research and development work. Procedures which apply in one field cannot be used in another.

Underlying the entire Navy research and development structure, however, are certain formal guidelines which apply to our programs as a whole. The basis of the entire program stems from operational requirements, which are formal written statements of the operational needs of the Fleet.

Certain formally constituted groups provide guidance and cooperation of naval research and development from the highest command, administrative and scientific levels.

(*Continued next page*)

The Hook-Up for Industrial Logistics

(*Continued from page* 20)

The firm that can produce military items in significant quantity, should bring this potential to the attention of Industrial Mobilization Planning Officers. Here is how it's done. The firm should obtain from the Superintendent of Documents, Government Printing Office, Washington, D., C. two very helpful pamphlets for 25 cents each. The pamphlets are known as "How to Sell to the Department of Defense" and "Purchasing Items and Purchasing Locations of the Department of Defense." (Remember, Department of Defense means Army, Navy and Air Force.) In other words, these books tell you which military office buys what items. The office which buys is the office which plans. By using these booklets a manufacturer can tell whom to contact regarding either current business, or future business in event of war.

Once the manufacturer knows whom to contact, it is up to him to sell the desirability of planning with his firm. The manufacturer should bring to the attention of the planning officers the advantages of his facilities, he should state succinctly what his plant can do, he should outline its capacity, the kinds of tooling and equipment it has, the kinds of work it has done, and demonstrate why he thinks planning with his company would strengthen industrial preparedness. If the manufacturer successfully demonstrates the wartime value of his plant with respect to specific items, the planning officer can then have the firm entered in the Alphabetical Register and an ASPPO appointed, as described earlier in this article.

Production Allocation Planning should not be confused with the Industry Studies being made under the sponsorship of the Business Defense Services Administration. Those studies are primarily concerned with component production capacity. They deal with overall ability of a total industry to meet the combined essential military and civilian war-time demand, for categories of common components. Production Allocation Planning is consumer-producer planning with a direct across-the-table relationship between the potential buyer and the potential seller. It is concerned with the ability of a specific individual manufacturer to meet an agreed on mobilization production schedule for a specific item. This item may be an end-item, subassembly or peculiar component for a particular military purchaser.

Industry studies made by the Business Defense Services Administration and specific mobilization production schedules developed under the Production Allocation Program are complementary to each other. Each deals with an equally, but different, aspect of industrial readiness. Both are part of the pattern of preparedness.

Just as our colonial ancestors lived with the constant threat of surprise attack by marauding Indians, we of this era have to face the threat of surprise attack by marauding aggressors bent on world conquest. Just as the village blacksmith turned from shoeing horses to forging weapons, the modern industrial plant must be ready to turn from making peacetime products to wartime necessities.

Common sense requires that the technology of the engineer, and the production "know-how" of the American industrialist must be among the weapons stored in the Arsenal of Democracy.

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The Navy's Stake in Underwater Acoustics

(*Continued from page* 77)

The real backbone of technical coordination within the Navy, however, is carried out on a day-to-day basis through the constant association of working people from bureaus, laboratories, and the Office of the Chief of Naval Operations.

Likewise, a portion of our basic philosophy concerning the coordination of research programs is the idea that the men and women who are actually doing the research should be brought together as often as possible. Real coordination cannot be achieved unless groups working on similar problems have sufficient respect for one another that they do not question each others' results or procedures. There must be no need to have the work re-done to ensure that it is correct from everyone's point of view. . .

After World War II, the Navy realized that broad gaps existed in its undersea capabilities, and that underwater acoustic research must play a major role in closing the gaps. There was also a realization of the complexity and variety of the underwater acoustics field and its naval applications. The lessons of that war taught us that we had to find the answers to certain questions, and that the Chief of Naval Research and the Chief of Naval Operations must be constantly kept abreast of progress in underwater sound.

As a result, the Underwater Sound Advisory Group was formed in 1948. This is specifically an advisory group. It is composed of representatives in high-level positions at each major Governmental laboratory that does work in underwater sound. It was formed in order to get the answers to pressing questions and to advise the Chief of Naval Research and the Chief of Naval Operations regarding progress. It also functions as a liaison organization, in order to effect better communication between the Office of the Chief of Naval Operations and the laboratories.

* * *

Our purpose is to conduct research programs which support the mission of the Navy in the defense of our country. We want to conduct these programs in such a way that the Office of Naval Research will continue to enjoy the confidence and esteem of the scientific community.

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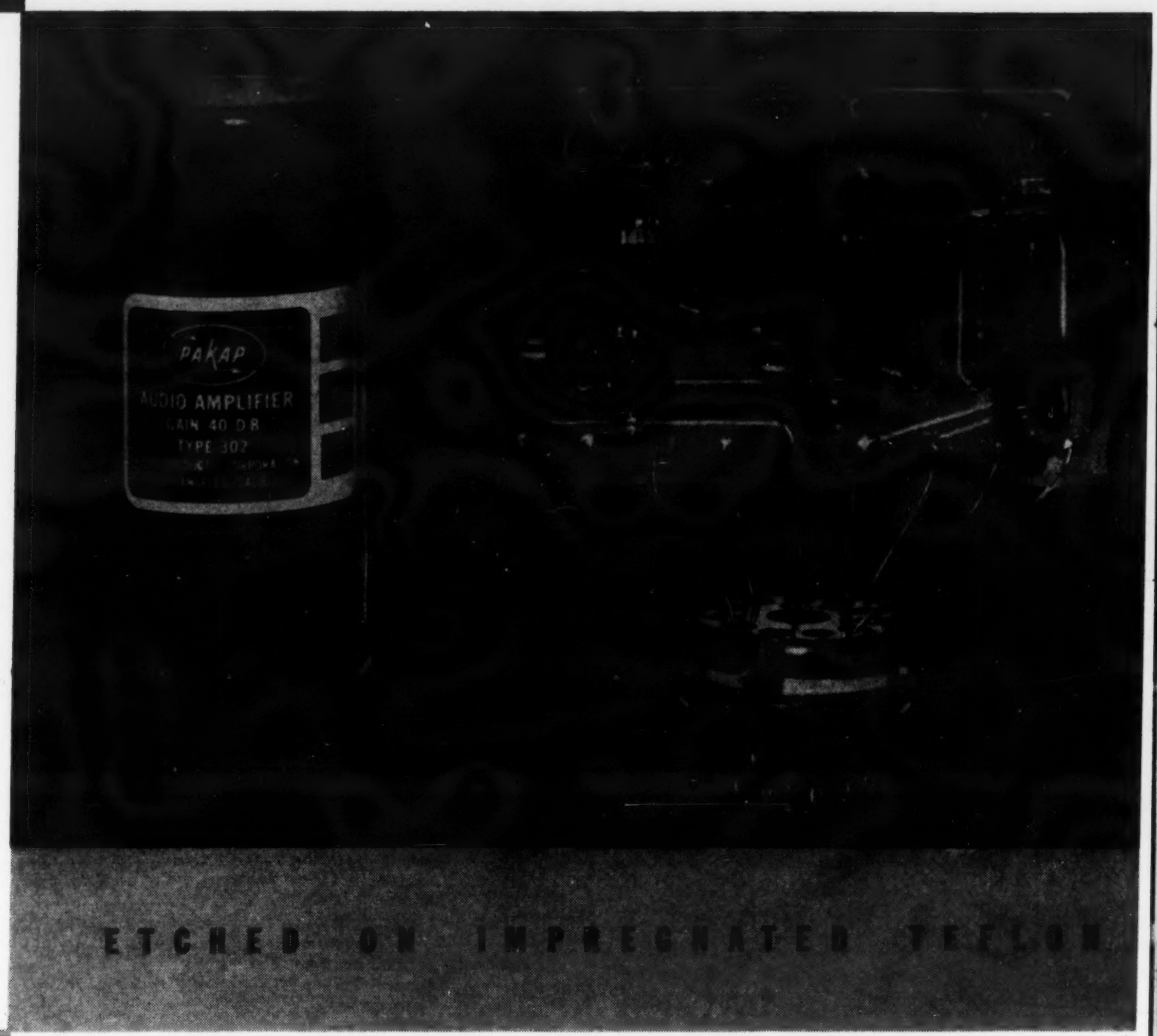

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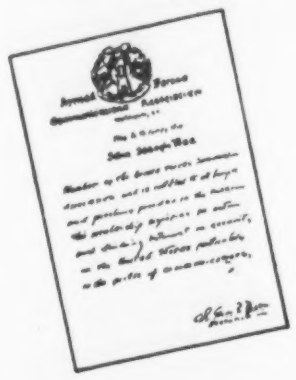

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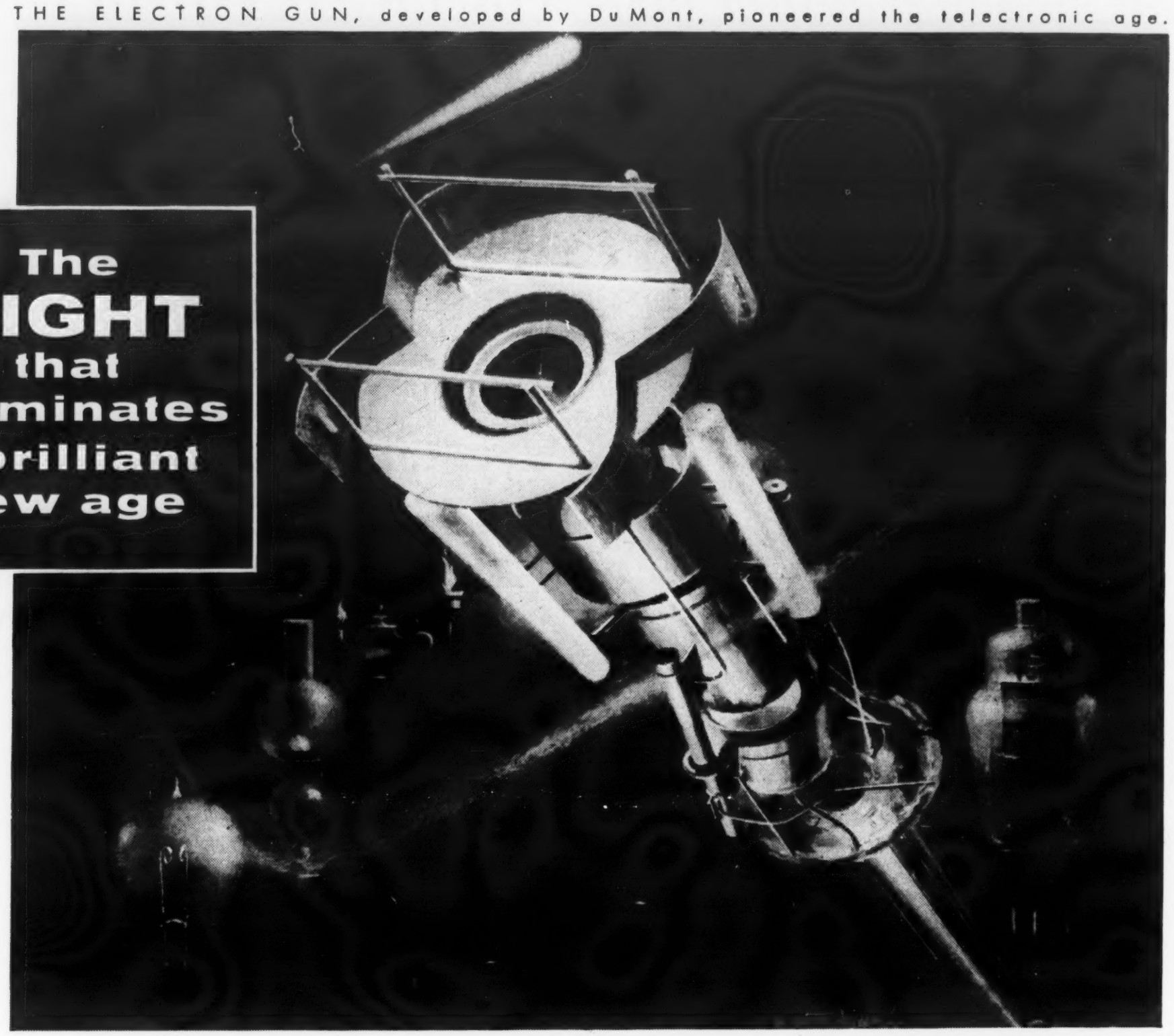

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